Irradiation Reviewed

AUGUST 1955

35 CENTS

FOOD ENGINEERING

A McGRAW-HILL PUBLICATION

PACKAGING • Dr Pepper comes up with answers on beverages in cans. p. 52

ENGINEERING • Pumped from boat, sardines are processed in open cans. p. 48

INSTRUMENTS • To overcome bad time lag in controlling temperature of chip cooker, product flow is regulated. p. 75

ALSO: PROCESSING • INGREDIENTS • MAINTENANCE
MATERIALS HANDLING • PRODUCTS • QUALITY CONTROL
SANITATION • TRANSPORTATION • PERSONNEL

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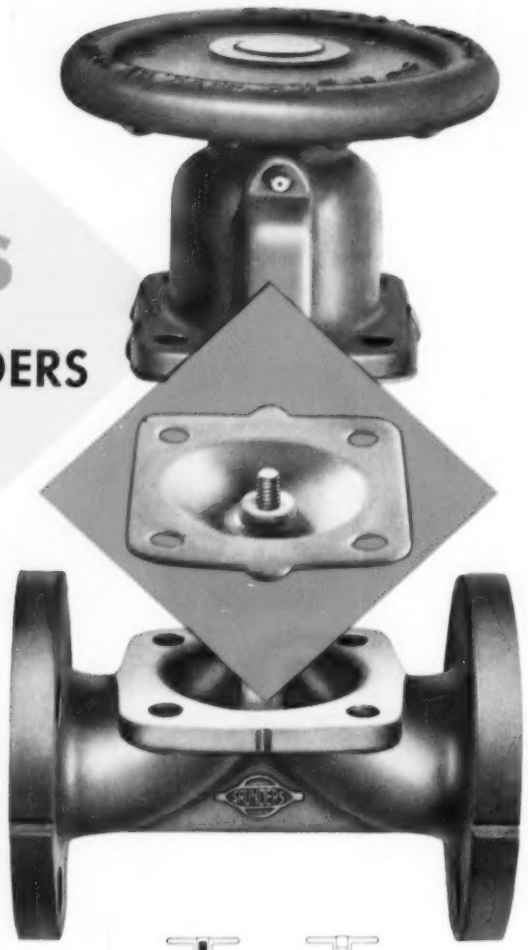
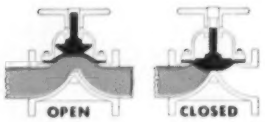
INQUIRY COUPON INSIDE BACK COVER

Unaffected by all chemicals normally found in industry

Teflon Diaphragms

for GRINNELL-SAUNDERS DIAPHRAGM VALVES





Having valve trouble? Are your chemical services so tough that valves disintegrate? Grinnell-Saunders Diaphragm Valves with TEFLON* diaphragms may solve your problems.

Grinnell TEFLON diaphragms are made by a new and unique process which produces a better product of greater density, toughness and flex life. TEFLON offers a high degree of chemical inertness to all chemicals normally found in industry.

Grinnell-Saunders Diaphragm Valves are available with bodies of iron, bronze, stainless steel, cast steel, aluminum, Monel, Saran, Durimet; and with body linings of glass, lead, soft or hard rubber, neoprene, Saran. Diaphragm life depends on temperature, pressure, and frequency of operation. Your inquiries, which should be accompanied by complete service data, will receive prompt attention.

**Registered Trade-Mark, E. I. du Pont de Nemours & Company, for its tetrafluoroethylene resin.*

- Diaphragm lifts full height for streamlined flow in either direction
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- Diaphragm absolutely isolates working parts from fluid . . . sticking, clogging, contamination, corrosion eliminated
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AUGUST 1955

Volume 27 Number 8

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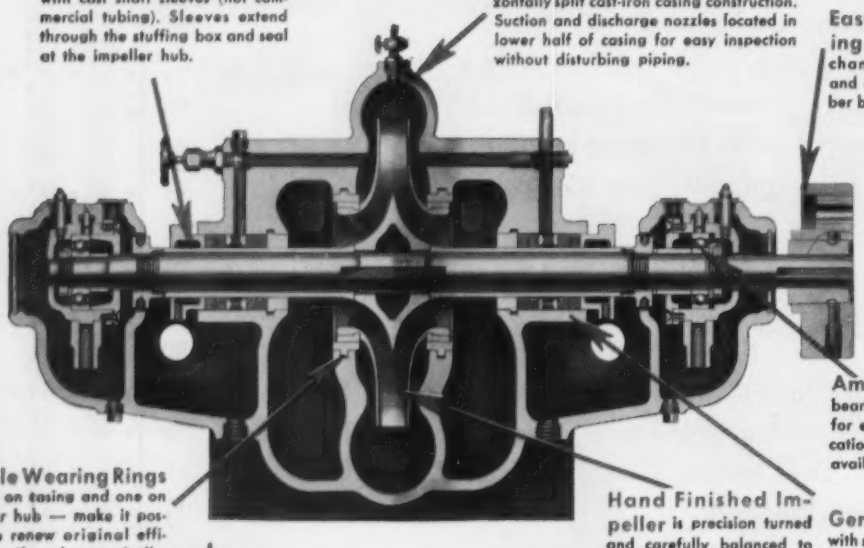
Get 8 Advantages of GOOD PUMP DESIGN

ALLIS-CHALMERS
Double-Suction
PUMPS



Longer Shaft Sleeve Wear with cast shaft sleeves (not commercial tubing). Sleeves extend through the stuffing box and seal at the impeller hub.

Greater Rigidity with heavy horizontally split cast-iron casing construction. Suction and discharge nozzles located in lower half of casing for easy inspection without disturbing piping.

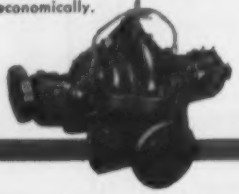
Easy Coupling Mounting with *Magic-Grip* quick change bushings for pump and drive shaft. Pin and rubber bushing type usually used.

Ample Bearings — Ball bearings may be furnished for either oil or grease lubrication. Split shell bearings also available in larger sizes.

Double Wearing Rings — one on casing and one on impeller hub — make it possible to renew original efficiency easily and economically.

Hand Finished Impeller is precision turned and carefully balanced to assure vibrationless operation and close wearing ring clearance.

Generous Stuffing Box with sufficient packing to keep stuffing box maintenance low. Provision made for sealing water connection or grease seal if required.



Wide Choice of Materials is available for all types of service — iron, bronze, stainless steel and combinations.

HEAVY DUTY CONSTRUCTION with no skimping, no corner cutting is what you'll find in Allis-Chalmers double-suction pumps. Extra metal thicknesses, extra strong parts, extra features and extra careful workmanship add up to long life, low maintenance, and low cost per gallon pumped.

Every Allis-Chalmers double-suction pump is carefully tested on the most modern testing equipment in the industry. Each installation is individually engineered by men whose experience in thousands of pump installations will give exactly the right pump for your needs. Stock sizes from 10 to 7000 gpm with heads to 475 feet.

Complete Pumping Unit

Allis-Chalmers can furnish the complete installation — pump, motor, control and drive — all built of coordinated design and manufacture.

Whatever your pumping problem, call your A-C Authorized Distributor or District Office. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 08B6146.

A-4590

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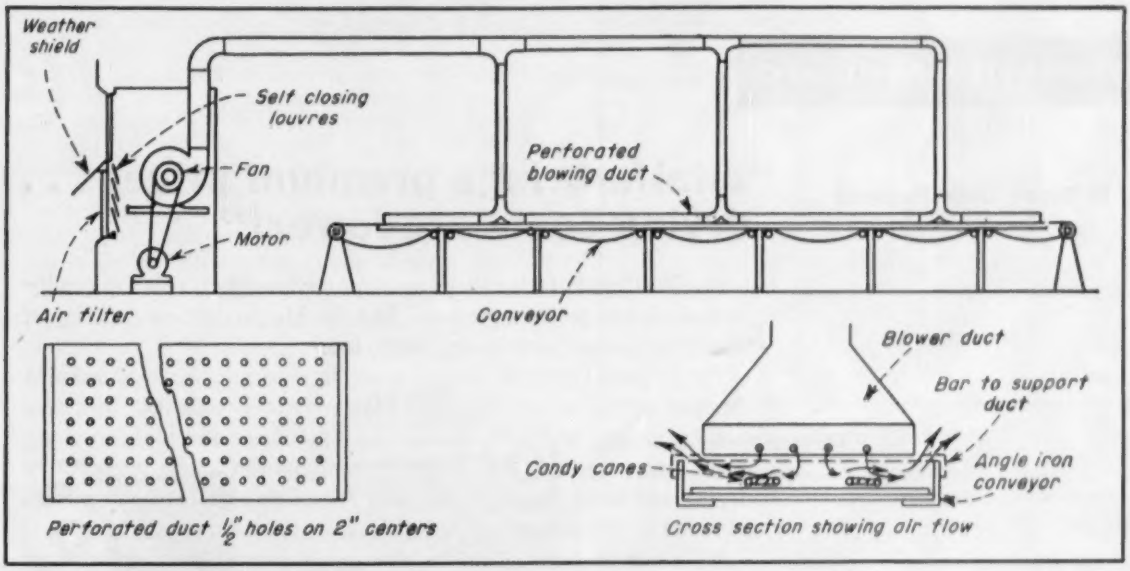
PRACTICAL IDEAS



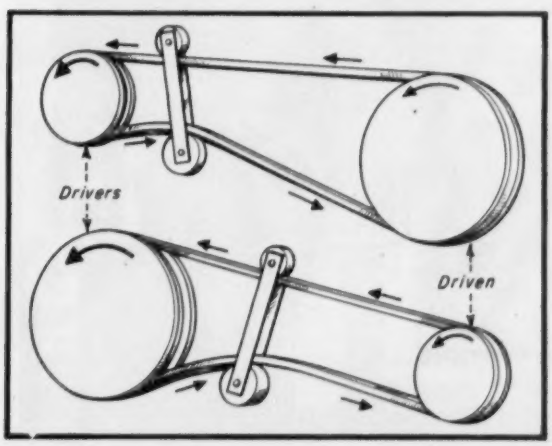
Cools Without Refrigeration

We have developed a method of cooling candy canes more effectively and cheaper than the traditional way of conveying the canes through an enclosed tunnel in a draft of refrigerated air. When the volume of fresh air employed for cooling is sufficient, it is not necessary to use refrigerated air.

Here is the layout we employ and also details of the equipment needed.

Provided was an air chamber (see sketch) with weather protecting louvers and filters, opening to the outside atmosphere. Then a high volume CFM ventillating fan with drive motor was installed. The air ducts employed were graduated in size to maintain even pressure in each section. These deliver a high volume of air at normal temperatures to the cooling conveyor through specially perforated flat blowing ducts.

Since candy canes must be carried lengthwise along the conveyor in order to keep them straight, they occupy a relatively large section of the belt and they must be cooled quickly and moved off at the end. At a cutting speed of 70-7 in. canes per minute a 50 ft. blower duct will cool 85 canes in its length in 80 sec. This performance compares with a cutting speed of 55-7 in. canes per min. requiring 100 ft. of cooling tunnel using refrigerated air and requiring three minutes cooling time.—*R. Stanley Field, Sherry Anne Candy Co., Philadelphia.*



Automatic Belt-Drive Take-Up

In locations where there is no room for an adjustable take-up, here's an automatic one that has several advantages over those that are fixed or adjustable. Device can be made at little cost and will perform better in any position than any other take-up.

Side plates (beachheads) can be made of bars or angle irons with sleeves welded in place to receive shaft on which rollers are installed. Setscrews must be used in sleeves to hold small shafts securely.

It is necessary that bearings used in rollers be high speed self-lubricating type. This is very important in order to avoid oil or grease getting on belt.

It is well to use a slightly smaller pulley on the tight side of belt than on slack side. There will thus be more friction to cause this pulley to follow the tight side of the belt toward the driver.

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Louisville Method

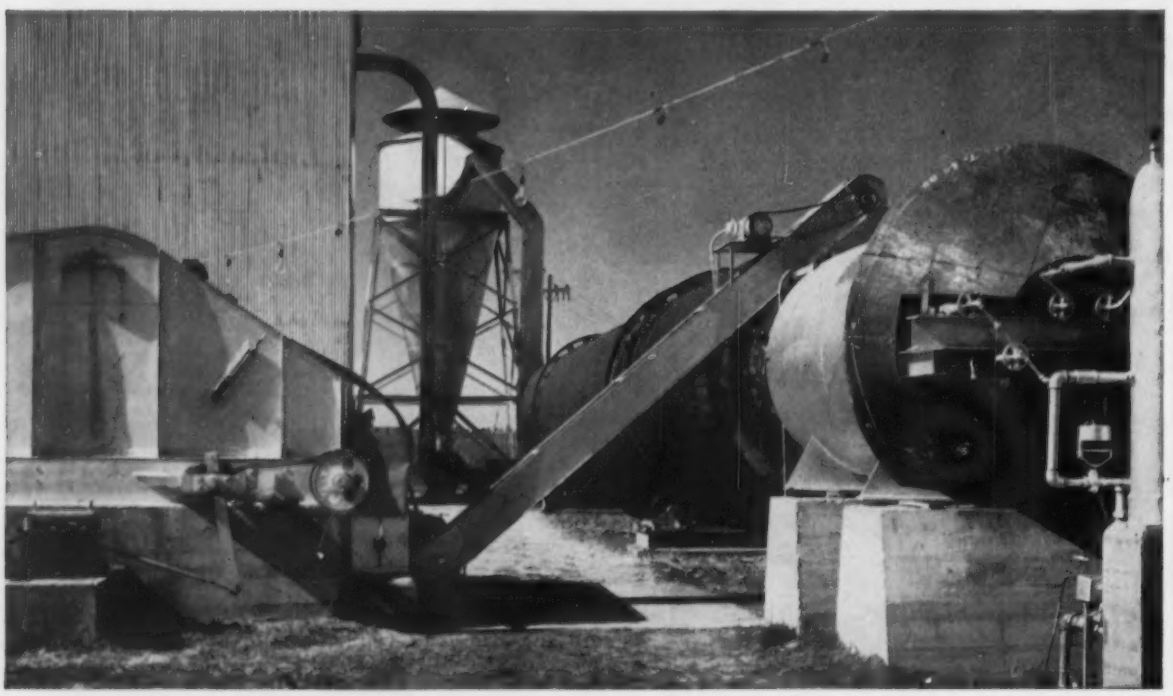
Type H Dryer User Reports . . .

"alfalfa brings premium prices . . . drying costs are *lower!*"

Louisville Type H Dryer keeps carotene content high. This top quality commands top prices anywhere. And the big production capacity of this dryer means lower drying costs, too.

The Type H Dryer, developed to retain maximum carotene value in chopped alfalfa, is also useful for handling other feedstuffs, including sweet potatoes, bagasse and sugar beet pulp, pea and soybean vines, green corn, vegetable waste, etc. Its combination of low temperature drying and large capacity will save you money on production costs and enable you to turn out a high quality product.

With our 53 years of drying experience for all types of industry, we may be able to add extra profits for you, too. Write for our Type H Dryer bulletin. Or ask for a Louisville engineer to look over your drying operation.



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Dryer Sales Offices: 139 So. Fourth Street, Louisville 2, Kentucky • 380 Madison Ave., New York 17, New York
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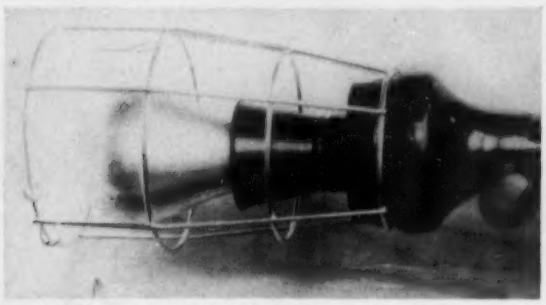
OFFICES IN ALL PRINCIPAL CITIES

When this take-up device is used belt will never tighten to place an undue load upon bearings. In fact, actual load upon belt is that which is required to drive the piece of equipment, since there is no stress caused by any type of the tightening take-ups generally employed. Only possible load upon belt is the driven load. It is readily understandable therefore that the life of belt or belts is increased considerably since there is no slippage or shock nor overload.

In operation, this device is never at any fixed point on belt, but will move forward or backward according to the load upon the belt. Slack of belt return is always tight enough to keep a good wrap upon driver.

This device can be depended upon to eliminate most take-up problems in almost any type of drive.—*Emmett Nicholson, Industrial Engineer, Dunedin, Fla.*



Reducing Inspection Lamp Glare

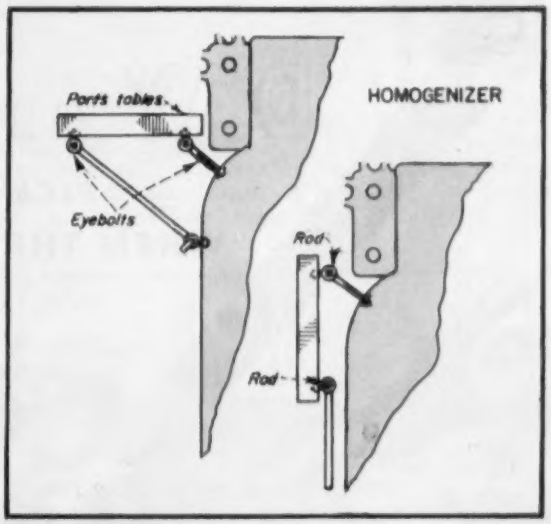
A safe and popular inspection lamp for use in maintenance work is wire frame protected type on extension cord (see photo). However, it has the defect of being unshaded, causing a tiring glare impeding lighting of working position.

A simple method of shading portable inspection lamps is to paint the exterior of bulb with heat-resisting aluminum paint. This coating has high reflectivity, but is sufficiently opaque to act as an effective shade.

Inspection lamps can be held in the hand, hung from an overhead support or placed on the ground; the position of the paint on the bulb is governed by the method of using. Light bulb shown is painted all over except for a small circle at the end of the bulb. This enables it to be used like an electric torch or flash lamp. An alternative arrangement is to paint one side of bulb so shaded side is arranged to face user and light falls on work when the lamp is placed vertically. —*C. T. Bower, Tool Engineer, London, Eng.*

Packaging-Unit Slipperiness Test

With plastic-coated papers and foils being used more extensively, problems involving frictional drag have become more and more common. On certain types of packaging equipment, excessive surface friction between polished metal surfaces and plastic film coatings can cause very significant difficulty. The amount of drag to be expected from a given coating may be fairly well estimated by use of an inclined plane arrangement. The coated material is fastened to the plane, and a weighted platen with a polished bearing face is rested on the surface. Slope of the incline is slowly increased until the platen begins to slide. The angle at which this occurs is recorded as the slipperiness value.—*C. M. Woodcock, Jr., Section Head, Packaging Research Section, General Foods Corp., Hoboken, N. J.*



Speeds Homogenizer Cleaning

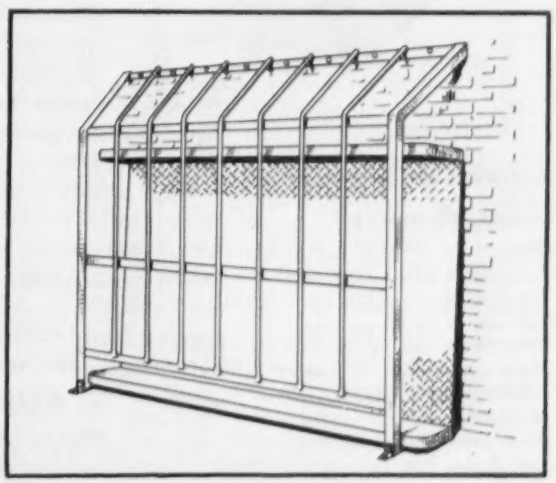
An interchange of parts of four 300 gph. Manton Gaulin homogenizers in our plant presented a real problem which was made more serious since space allowed only for a table far too small for the job.

This problem was solved by making a hinged parts table (see sketch) attached to the frame of each machine. This parts holder, which was made 14 in. x 20 in. with 1¼ in. sides, was provided with mesh bottom covered with rubber.

Now by following a special disassembly pattern and by providing spaces for valves, etc., we have reduced parts damage and speeded cleanup as well as reassembly.

Also, when the machines are assembled an extra 14 in. of aisle space is obtained by lowering the shelf, the hinge for which is made of a rod through two high bolts.

This idea can also be applied to Waukesha pumps and other equipment, as we have learned from experience in our plant.—*Marlin Easterday, Engineer, Foremost International Dairies, Ridgeland, Wisconsin.*



Safe Storage of Dock Boards

Many employees have been needlessly injured by dock boards. Such boards have caused serious accidents—as those that were carelessly left lying on the dock, or ones which fell to the floor after they had been placed upright against a wall.

NEW '55 FMC SWEET CORN HARVESTER LETS YOU PICK 'ROUND THE CLOCK —WHEN THE CORN AND YOUR PLANT ARE READY

Save minutes and dollars with the rugged FMC Sweet Corn Harvester, the only machine specifically designed for sweet corn harvesting. Reliability and dependability are proved by performance records season after season, under all conditions—in heat, dust, rain, rough fields—in night and day operation.

Minutes mean quality, for corn must be picked when it's ready! Picking delays and interruptions common to hand picking operations downgrade product quality and disrupt plant schedules. That's why each season finds more growers switching to FMC Sweet Corn Harvesters, always dependable, always on the job when there's picking to be done.

Minutes mean profits. One FMC Harvester replaces 10 to 15 hand pickers, with a reduction of up to 57% in picking costs! There's a 10% bonus in increased cut-off weight—up to 10% more corn per ton over hand picked corn. In addition, smooth, more profitable plant scheduling is assured.

Now is the time to order your FMC Sweet Corn Harvester for consistently higher yields at lower costs.

1st Choice of Canners, Growers, Operators!

- Cuts picking costs up to 57%
- Delivers 10% more cases of "cut-off" corn to the cannery—less green weight
- Works day and night, under all weather conditions
- Reduces labor problems—does the work of 10 to 15 hand pickers
- Mounts on most tractors
- Simple operation, with all controls convenient to driver
- Sturdy construction throughout for trouble-free operation, lowest maintenance

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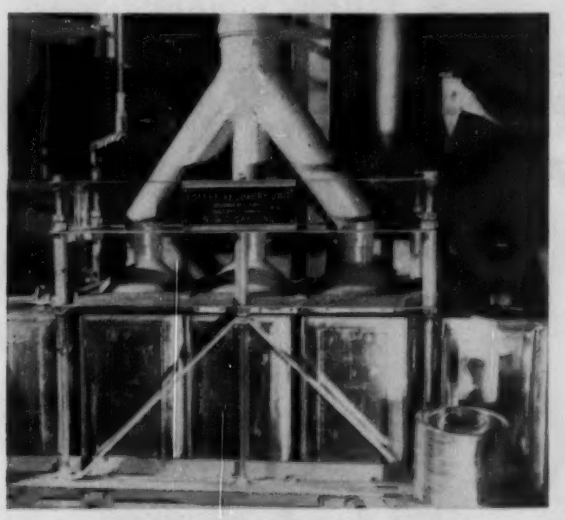
Key to food equipment

If boards are housed behind a protective grille (sketch) after each use, injury caused by the boards will be decreased. The framework can readily be fabricated out of angle iron, strap iron, and/or rods, as one shown, fabricated by Ralston Purina Co., St. Louis.



Coffee Recovery Unit

Twenty-thousand pounds of coffee a year are saved and damage to can seamer eliminated at Oakland (Calif.) Naval Supply Center with this "comminuted material recovery unit".

The major problem was to recover coffee which, in the filling-vibrating operation, was left in lip and on top of 20 lb. containers. Former procedure was to brush residual coffee from the can tops into a trough below. But, considerable amount missed the trough resulting in loss of material.

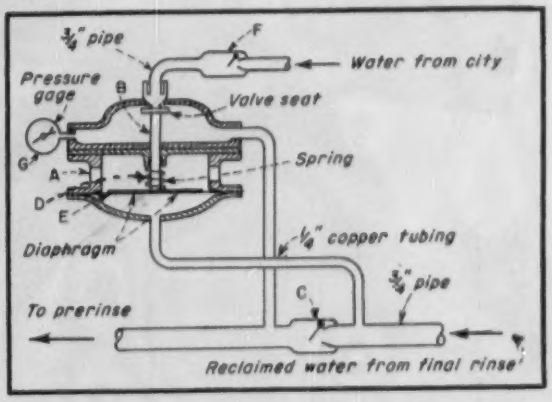
From the filler where cans are vibrated to settle the coffee and permit filling to full weight, cans move on a chain conveyor to the recovery unit. All operations of this unit are cam-actuated, and it is synchronized with the filling unit. The filler conveyor and cams are driven by same chain. It first halts and positions three cams under the three recovery valves. A lever then raises and presses the cans closely against the recovery valves.

There are three of these valves. They are so devised that they cover the entire top surface of the cans. In the center of each is a central valve (heart of the unit) which enters, and hermetically seals the filling hole in the can so no product is removed from inside the can. Vacuum is actuated and the residual coffee is drawn back into the scale supply-hopper. Suction is then shut-off and cans lowered to the chain conveyor which moves them to the vacuum type lid closer. Simultaneously, as can moves from under recovery unit, vacuum removes any coffee spilled in the trough (below the conveyor) and conveys it to the scale supply hopper. This is shut off automatically, and the recovery procedure repeated.—*Ernest Purse, 8801 Seneca St., Oakdale, Calif.*

Clear Visibility of Petri Dishes

Bottoms of Petri dishes which have been in use for some time become scratched and etched from wear and tear of usage and washing. Counting colonies through scratches on some of the more worn plates is almost impossible. However, by merely rubbing a drop of mineral oil on the bottom of the dish, the scratches are filled in and covered over by the oil to make the plate as clear as it was when new.

All of us here at the laboratory have a dropper bottle of mineral oil handy when we count plates. This idea has really helped in getting more accurate counts and also in cutting down the eye strain.—*Robert Rowe, New Jersey Dairy Laboratory, New Brunswick, N. J.*



Efficient Washer Operation Assured

Provided in the bottle washer we use is a tank arrangement for collecting water from final rinse tubes. This water is pumped from the tank through a strainer, then to the pre-rinse of the washer. Too often, however, for various reasons such as the tanks running out of water, the strainers becoming clogged, the pumps becoming air bound, etc., we lost effectiveness of the pre-rinse. This frequently made it necessary to replace the bottle washing compound and clean the soaking compartment.

Here's how we have arranged to always have water for pre-rinse in spite of previously mentioned failures.

Into the system we connected a diaphragm type valve which was formerly used on one of our beverage fillers. This was piped into the system to allow city water to enter the reclaimed water line whenever a failure in the pre-rinse line cut delivery of sufficient water or water pressure.

This is the arrangement we use and how it operates.

From the reclaimed water line, a quarter inch copper tubing is piped to the diaphragm side of the control valve—(A) in sketch. Stem (B) of this valve is spring-operated to close and open the inlet to which the city water line is piped. Exit from inlet section of the valve, controlled by valve stem (B)., is piped to reclaimed water line enroute to pre-rinse, between the pre-rinse section of the washer and a check valve (C) which is inserted in the reclaimed water line between the two lines that are piped to the control valve.

Tension in the spring (D) determines the pressure at which diaphragm (E) will operate valve stem (B) to open or close city water line. Now, when the pressure in the reclaimed water line drops below pressure set by the spring on the diaphragm, the valve stem (B) will be lowered by the diaphragm to permit city water to enter and pass into the reclaimed water line to the pre-rinse. Check valve (C) in the pre-rinse line prevents city water from flowing back into the accumulating tank, while a check valve (F) in the city water line prevents reclaimed water from entering the city water line.

Onto the side of the diaphragm valve is attached a pressure gage (G) which indicates which source of water is being supplied to the pre-rinse at any time.

When you specify **INSULATED** *tank cars, get the advantages of the new*

acf-BUILT DURADOME TANK CAR

all-welded heavy gauge insulation jacket

When insulation is required...insist on the new DURADOME insulation jacket with four important benefits...

- Duradome's insulation jacket is of heavier gauge steel...provides greater resistance to impact... assures a long, virtually maintenance-free life.
- All-welded construction does away with old-fashioned angles and bolts...greater corrosion resistance...streamlined...more weatherproof.
- One-piece ellipsoidal heads together with rigid spacers provide a contour-formed jacket...assure maximum efficiency through uniform insulation.
- Special ventilation device at bottom of jacket prevents accumulation of condensation . . . protects tank and insulation jacket from corrosion.

Whether you lease or buy, ask your Shippers' representative about the many *other* Duradome features . . . *flued dome . . . ring section construction . . . standardized underframe* . . . available on *all* standard Duradome tank cars at no extra cost.

Specialists for over 35 years in the leasing, operation, maintenance and servicing of tank car fleets—now exclusive sales agent of acf *tank cars for industry.*

SHIPPERS CAR LINE SHPX

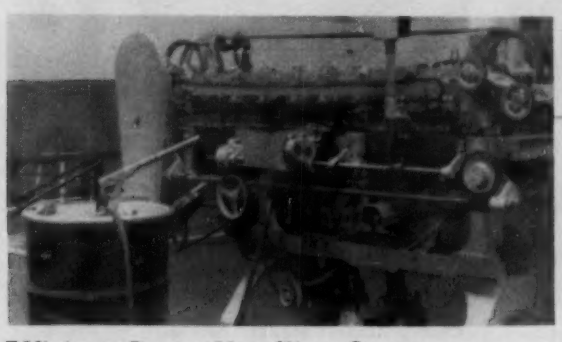
Shippers' Car Line Corporation

A subsidiary of acf INDUSTRIES, Incorporated

30 Church Street, New York 7, N. Y.

CHICAGO, ILL. • HOUSTON, TEX. • SAN FRANCISCO, CAL. • MILTON, PA. • EAST ST. LOUIS, ILL. • SMACKOVER, ARK. • TULSA, OKLA. • NORTH KANSAS CITY, MO.

The use of this valve has not only provided us with more effective bottle washing, but has shown a saving in washing compound and labor required for recharging the solution tanks.—*A. J. Morgan, Jr., Norfolk Coca-Cola Bottling Works, Norfolk, Va.*



Efficient Paste Handling System

We have installed an Alemite grease pump (No. 7198L) in the removable head of a steel lap paste drum. The pump is connected by a rubber hose through the bottom of the lap paste reservoir by means of a pipe union. Thus the reservoir may be removed for cleaning. When not in use on the labeler, the union half on the hose is plugged with a pipe plug.

During the operation the drum is on the same side of the machine as the operator, so that when the reservoir runs low it can be refilled with a few strokes of the pump handle.

After two years of operation in this manner we have found the following advantages:

1. The lap paste is always clean.
2. All the paste in each drum can be removed, none wasted.
3. The pump action "works" the paste so we are able to carry a low paste level in the reservoir.
4. A source of unsanitary conditions has been eliminated (i.e. spilled paste).
5. Lap paste can be stored for extended periods of time and yet be ready for use immediately.
6. By changing the "pump lid" to a new drum the supply can be replenished in less than a minute.

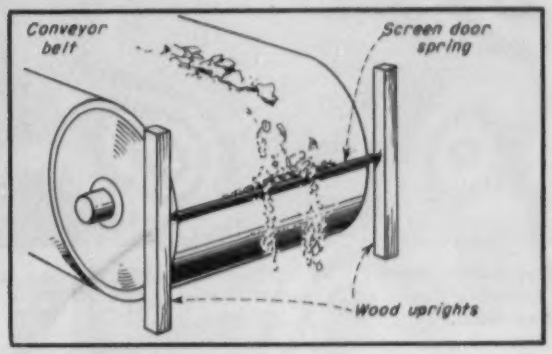
The same method can be employed for feeding liquid pick-up glue when labeling cans or frozen foods.—*R. L. Stanton, Plant Superintendent, Producers Service Corp., Benton Harbor, Mich.*

Lift-Truck Safety Hint

Injuries have been reported (some of them fractures) when the guiding wheels of lift trucks hit objects and jerk the steering wheel, causing the spinning knobs attached to them to strike employees arms.

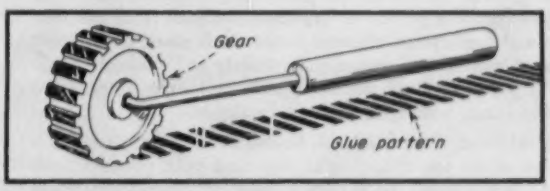
Several companies have been asked about this hazard and most of them say they have outlawed these knobs.

A fork-lift, like a car or a truck, can best be controlled through the coordination of two hands and arms. It may be practical to outlaw in your plant the knobs attached to steering wheels.—*It's Your Business, American Meat Institute, Chicago.*



Cleans Conveyor Belts

Here's an easy way to remove products that adhere to belts during processing. This method is particularly effective on leafy vegetables, cut beans, asparagus, etc. Just attach a screen door spring—stretch it from one side of belt to the other across the discharge end, and in contact with the conveyor belt surface. The belt will be kept fairly clean.—*Harold Gray, Plant Manager, Farm Fresh Packing Corp., High Town, N. J.*



Way to Glue Hand-Sealed Cases

Here's a simple method of applying glue for case sealing, plus details of an easily constructed glue applier.

The latter is made from a small gear to which a handle is attached. This provides an applier device similar to a paint roller.

When the gear roller is dipped in glue and applied to a case, a stencilled pattern of adhesive results. This way there are several advantages: First, much less glue is needed. Second, though the flap is adequately sealed it is much more easily opened than when the entire area of the flap is glued. —*J. J. Ducharme, Technical Service, National Adhesives, San Francisco.*

CAN YOU USE $50?

Then here's an opportunity to get it.

Send one of your ideas to FOOD ENGINEERING.

Each month $50 is presented to someone like you for the best item in this department. And the chance that it will be you is now running about one in twelve.

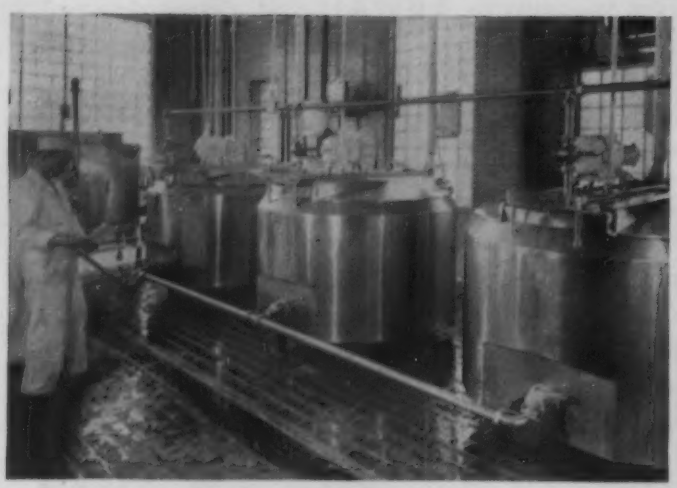
Also $5 to $15 is paid for each contributed item used. So a few minutes time may net you as high as $65.

Just send us the facts about your idea and its application. And include a free-hand sketch or snapshot to illustrate it.

We'll do the finished writing and drawing for you.

Send it today, before you forget. Address it to Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.—The Editors

JUNE PRACTICAL IDEA WINNER was "Way to Reconstitute Milk Powder," submitted by Rudy Schweiss, Maintenance Supervisor, Spencer Milk Products, Spencer, Wis.



Cherry-Burrell Model "WP" (300 gal.) Spray Type Round Processor—for steam or hot water heating to 200° F; cooling to within 10° of city, well or tower water.

Cherry-Burrell Model "EP" (1000 gal.) Enclosed Waterway Round Processor—for low-temperature cooling with high-velocity refrigerated water; heating to boiling temperature using hot water or steam.

Look first at all four types of Cherry-Burrell Processors before you buy any Processing Vat

You'll find it's sound purchasing procedure to look over *all four* types of Cherry-Burrell Round Processors *before* you decide which particular model best suits your requirements.

That's because Cherry-Burrell Processors give you such a wide choice . . . *the widest you can get anywhere* . . . of ways to process products. As illustrated here, there are four different models to choose from; each uses a different method to heat and cool a wide variety of liquid and semi-liquid products. Each comes in standard sizes from 200 to 1000 gallons, with special sizes available.

In addition, Cherry-Burrell Round Processors give you a choice of the *exact degree* of agitation your product calls for . . . ranging all the way from mild agitation for delicate products up to vigorous action for heavy-bodied mixtures.

Ask your Cherry-Burrell Representative which model best solves your specific processing and plant problems. Or send for our new bulletin.

CHERRY-BURRELL
CORPORATION

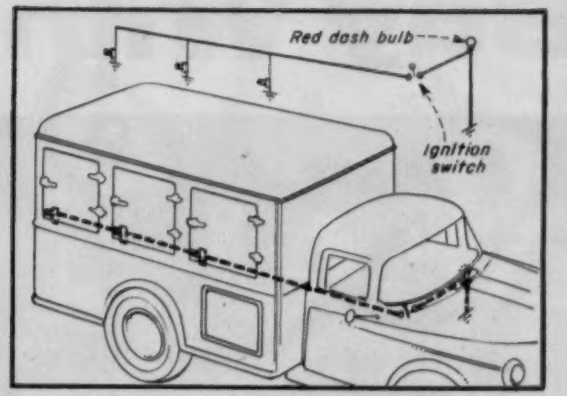
427 W. Randolph Street, Chicago 6, Ill.

Dairy - Food - Farm - Beverage - Brewing - Chemical Equipment and Supplies

SALES AND SERVICE IN 58 CITIES - U.S. AND CANADA

Cherry-Burrell Model "V-P" (300 gal.) Vacuum Pressure Processor—for steam or high-velocity hot water heating under vacuum. Pressure cooking to 250° F; for cooling to 40° F. with refrigerated water. Air unloading of product available.

Cherry-Burrell Model "DP" (300 gal. and 500 gal.) Direct Expansion Cold Wall Round Processor—for steam heating to 200° F; for low-temperature cooling with self-contained refrigerated water and direct expansion in combination.

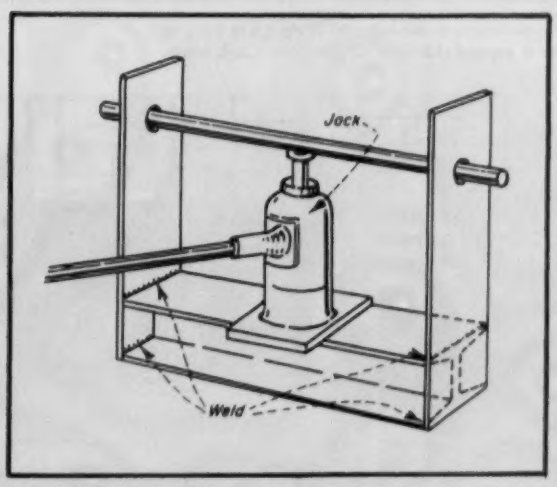


Warns When Truck Doors Are Open

Those who operate closed van-type trucks for delivery of products must be assured doors are closed in transit.

The van door or doors, as in the case of freezer compartments, may jar open or inadvertently be left open with resulting loss from merchandise falling out or products thawing. Also a van door swinging loose can rip off, and it may swing out far enough to damage passing vehicles.

We solved this problem easily. First we installed in each door frame a switch (normally open type) such as are used by passenger cars to light dome lights when the car doors are open. Then we put a red bulb on the dashboard of the truck. By wiring through the ignition switch, the red light on the dash does not light while the engine is not running during unloading periods. But as soon as the driver turns on the switch to start the motor the red light goes on "signalling" if a door is still open. Also the light will go on should a door jar open while the truck is in motion.—*Nathan Schoenbrun, co-owner, Penn Baker Supply Co., Scranton, Pa.*



Jig for Pipe Straightening

Here's an easy way to straighten bent pipe or to make slight bends at any desired location in a length of pipe.

To make the jig, weld ¾-in. steel plate to the ends of a 20-in. I-beam and then cut 1½ in. holes in each plate at the same height as the top of a hydraulic jack.

Bends can be pressed out of a "cold" pipe, or the area can be heated by a blow pipe in one hand, while the jack is operated by the other.—*Linde Tips, Linde Air Products Corp., New York.*

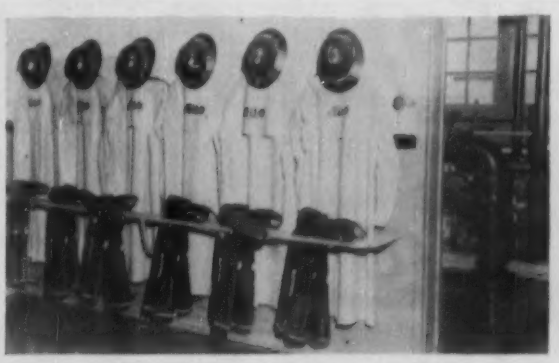
Cheese Mold Prevented by Ozone

In our plant we've prevented mildew on the walls and also development of mold on our cheeses by electrically generating ozone in the cheese cooler.

The ozone-making unit called "Air-03-Fresh Bluebird" is mounted near the ceiling and plugged into a nearby electrical outlet. Only .05 ppm. ozone in the air is sufficient to retard mold and mildew, bacteria, and fungus growth.

Three of the Bluebird units are installed in a cooler measuring 30x26x8 ft. Together, they require little more than a 45 w. lamp.

There is an added advantage: Besides keeping the cooler free of mildew and the cheese free of mold, they freshen the odor of the air in the cooler.—*Adolph C. Adbuehl, Manager, The Teegarden Cooperative Cheese Co., Menomonie, Wis.*

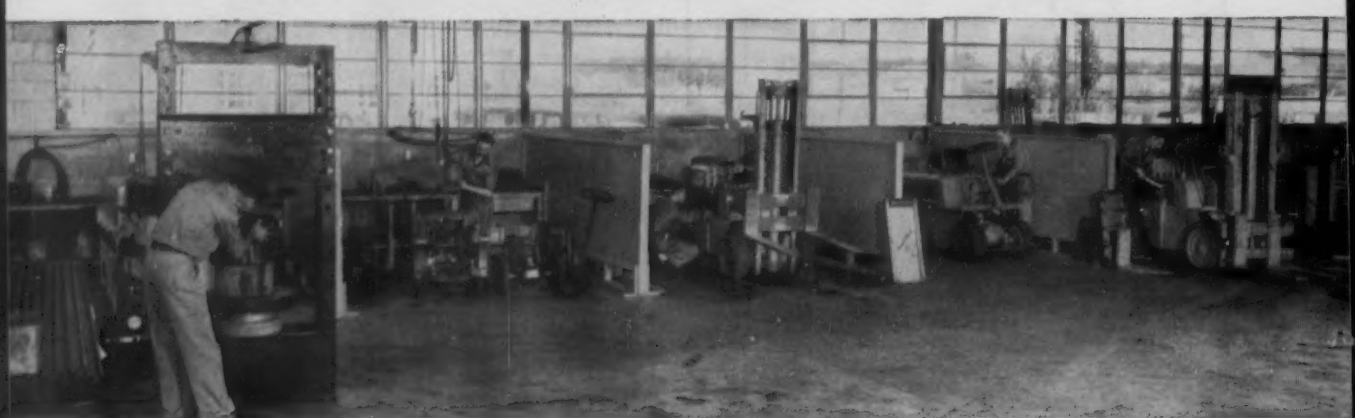


Practical Fire Equipment Rack

The Jell-O plant in Leroy, N. Y., recently constructed a special rack (see photo) to hold apparel for the plant fire brigade. Since others may be interested in making a similar installation, here is the breakdown of what rack and garments cost: Six raincoats No. 058 yellow BFG, $45.60; Six Daws Plastiglas Hedgard Helmets, $25.20; Six pairs MBK Storm King Steel Toe Boots, $57.60; Six coat hangars, $1.50; Transportation, $1.89; Labor and Materials, $55.83; Total cost $187.62—*GE Technical Bulletin, General Foods Corp., White Plains, N. Y.*

A Better Buy With

FAST PARTS SERVICE. Here's a sample of the largest parts inventory in the industry. It's a good thing to remember: you can depend on your local Clark dealer for a **complete** stock of Genuine Clark parts.



FACTORY TRAINED MECHANICS know your equipment best. Use specially designed tools and test equipment to meet Clark's rigid service standards.

MOBILE SERVICE for emergencies . . . for preventative maintenance on the job. Prompt service for tune-ups, minor repairs, lubrication, Genuine Clark parts.

Local Supply— Genuine CLARK Parts

Your local Clark dealer provides service facilities that have been developed for your needs. You expect the best from your Clark trucks and your Clark dealer is there to see that you get it. Here are 3 good reasons why it pays to put your service in the hands of your local Clark dealer.

1. Largest local supply in the industry. Your local Clark dealer's stock of parts is based specifically on the machine population in his territory. It's your best assurance of enough vital replacement parts to keep your equipment on the job.

2. Quality parts are guaranteed. Your local Clark dealer provides Genuine Clark parts—accept no substitutes. Get the parts that were engineered for your equipment . . . top quality parts that will give longer life, better service.

3. One source for complete service. Your local Clark dealer offers parts, maintenance, factory trained mechanics, a mobile unit for emergency service and preventative maintenance. It's your complete service package on a local level.

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
BATTLE CREEK 14, MICHIGAN

A BETTER BUY WITH LOCAL SUPPLY . . . GENUINE CLARK PARTS

Baking Industry Exposition — Oct., 1-6th — Atlantic City

VINEGAR, OIL *and* PIPE

Pfeiffer Food Products mixes vinegar and oil and secret things to create a fast-selling, especially-good salad dressing.

People have digestive systems equipped to enjoy the blend. A lot of pipe systems don't.

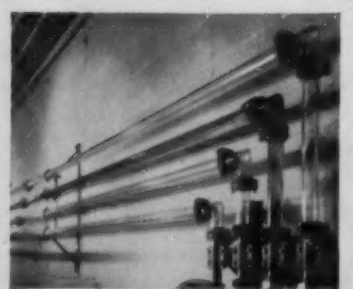
Vinegar eats away metal pipe—even corrosive resistant metal pipe. Oils find places to hide and cling and spoil.

Corrosion and contamination are expensive. But PYREX brand glass pipe isn't expensive—and it prevents corrosion and contamination.

Glass pipe refuses to be bothered by any food acids, hot or cold. Hard and smooth, glass denies slippery oils a place to cling.

Cleaning calls for a detergent, a rinse of steam or hot water or cold water. Cleaning goes on in place without down time.

Hundreds of food processors use PYREX brand glass pipe. They find it profitable. You will, too. To find out how much PYREX brand glass pipe can do for you, write, wire or phone for Bulletin EA-1.



You can mount PYREX pipe on walls or hang it as you would any pipe. It's easy to install.

CORNING GLASS WORKS, CORNING, N. Y.
58 CRYSTAL STREET
Corning means research in Glass

Doesn't Your Business Deserve the BEST SANITIZING AGENT?

insist on

GENUINE

Roccal

Reg. U. S. Pat. Off. and Canada

BRAND

SANITIZING AGENT

to do a more effective job throughout your plant!

In the Food Industry, the importance of using only the best sanitizing methods cannot be over-emphasized.

In Roccal, the original quaternary ammonium germicide, the food industry is offered a sanitizing agent that is laboratory tested and controlled. The uniform quality of Roccal means uniformly good results in doing a proper sanitizing job.

Roccal is a powerful germicide. In recommended dilutions, it is non-poisonous, non-irritating to the skin, virtually odorless and tasteless.

Roccal can be used for every sanitizing job in processing and packaging in the following food industries: milk, cream, ice cream, butter, cheese, egg breaking, sugar, fish, poultry, fresh frozen vegetables and fruits, meat products, cereal products, candy and beverage, wherever the product comes in contact with equipment. Also to keep walls and floors sanitary.

START USING ROCCAL TODAY—

you'll find that better sanitation is good business

Samples and Literature on Request

Sterwin Chemicals INC. 1450 Broadway, New York 18, N. Y.

Subsidiary of Sterling Drug Inc.

See Your Local Supply Dealer

USES IN FOOD INDUSTRIES

To Sanitize:

- STORAGE BINS
- FREEZING UNITS
- REFRIGERATORS
- CONVEYORS
- TANKS
- PROCESSING EQUIPMENT
- PACKAGING EQUIPMENT
- AIR CONDITIONING AND COOLING SYSTEMS
- WALLS AND FLOORS
- WASH ROOMS
- TRUCKS
- AND AS A HAND RINSE FOR PERSONNEL

Our Technical Service Department stands ready at all times to answer your questions about specific uses for ROCCAL

For more information, use coupon on last page.

Nash Instrument Air Compressors deliver only clean air, free from oil or dust, and without filters

Here is Why!

You can dispense with oil filters and dust filters when you install ©Nash® Clean Air Compressors. You can save the cost of maintaining these devices. You can greatly reduce instrument maintenance costs. For the Nash employs no internal lubrication, therefore no troublesome oil is in the delivered air. Moreover, air from a Nash is thoroughly washed and cooled as it passes thru the pump. Dust in the plant atmosphere, even fly ash, is immediately removed.

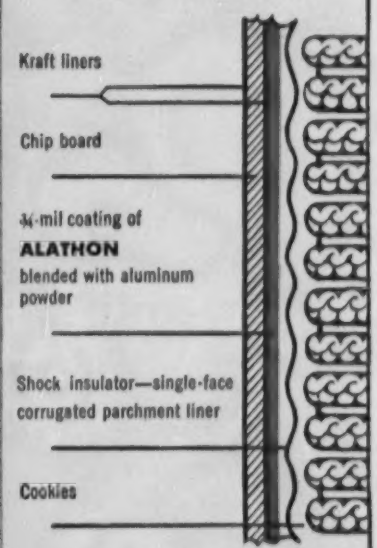
©Nash® Clean Air Compressors are simple, with only one moving element. No valves, gears, pistons, sliding vanes, or other enemies of long life and constant performance complicate a Nash. No aftercoolers are needed. You will find it profitable to investigate these pumps, now.

- No oil filters.
- No dust filters.
- No internal lubrication to contaminate air handled.
- No internal wearing parts.
- No valves, pistons, or vanes.
- Non-pulsating pressure.
- Original performance constant over a long pump life.
- Low maintenance cost.

NASH ENGINEERING COMPANY
395 WILSON, SO. NORWALK, CONN.

See how "Alathon" protects chip board-gives better display to bulk cookies!

CROSS SECTION OF COOKIE CADDY



Paperboard coated by J. D. Cahill Co.

"Alathon" blended with aluminum powder by L. A. Dreyfus Co.

Carton designed and produced by Robert Gair Company

Merchandising bulk cookies in retail stores presented a tough packaging problem for the Federal Sweets and Biscuit Company.

The high shortening content of the cookies stained corrugated caddies, so glassine innerliners were used. In addition, a printed overwrap was required for eye appeal.

After considerable testing, the Robert Gair Company of New York designed and produced the more efficient, more economical merchandiser shown above. The secret: a coating of pre-blended "Alathon" polyethylene resin and aluminum powder on the inside of the carton.

By applying a ¼-mil coating of the "Alathon" and aluminum powder blend to the back liner of .040" Kraft-lined chip board, a strong folding carton was developed with a foil-like finish on the interior. This produces a clean, sanitary appearance . . . and long shelf life results because of the non-staining and non-sticking properties of "Alathon." This new board also permits a much better job of printing than the corrugated board and results in a more attractive package without the use of an overwrap.

Unmodified coatings of "Alathon" also offer: strength; transparency; moisture resistance; heat sealability; low-temperature flexibility; chemical resistance; freedom from odor, taste and toxicity.

NEW 36-PAGE BOOKLET

"ALATHON® Polyethylene Resin as a Coating Resin for Flexible Materials" is yours free! Just send the coupon below.

DU PONT
REG. U.S. PAT. OFF.

ALATHON®
POLYETHYLENE RESIN

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Which type of package are you interested in?

- ☐ Multi-wall bags
- ☐ Single-ply bags
- ☐ Pouch bags
- ☐ Board cartons
- ☐ Board trays
- ☐ Fiber drums
- ☐ Corrugated boxes
- ☐ Fiberboard containers

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept. 548, Du Pont Bldg.
Wilmington 98, Delaware

Please send me information on the properties and advantages of "Alathon" polyethylene resin, including new 36-page booklet.

*Name*_____

*Title*_____

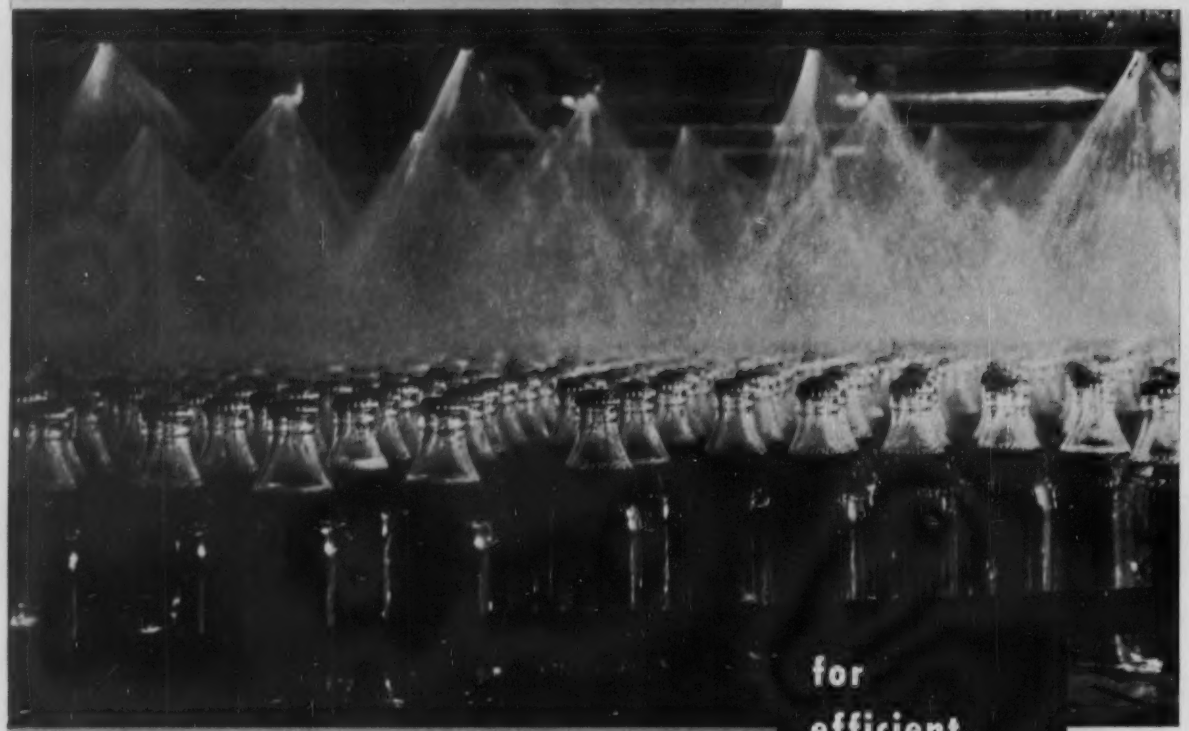
*Company*_____

*Address*_____

*City*_____ *State*_____

For more information, use coupon on last page.

Drenched WITH TEMPERATURE...



BY THE "ATOMIZED SPRAY" OF THIS *B-W VORTEX* PROCESSOR

for efficient pasteurizing, cooling, freezing or exhausting

This flood of finely sprayed water provides the most efficient and effective means of heat transfer. B-W's exclusive wide-opening, high-pressure spray heads are designed to provide absolute control of temperature.

This "precision processing" made possible by Vortex Processors protects the quality of your product . . . assures complete uniformity . . . eliminates spoiled batches. Even with unskilled workers, the simple and accurate automatic controls of the Vortex assure dependable quality control.

Find out why the Vortex is becoming so popular in the food processing industry. Write today for complete details and technical data.

336

BARRY-WEHMILLER MACHINERY CO.

4660 West Florissant Avenue • Saint Louis 15, Missouri

FLAVORS for that VERY SPECIAL EFFECT...

Do you take real pride in the quality and flavor of your food products? If so, you'll want to know more about the following flavoring specialties, each of which has been developed to impart certain very special effects and to lend extra taste appeal to the finished goods.

CHEERIO...

For the makers of fruit cakes, plum puddings, and mince meats! These traditional holiday specialties may be greatly enriched in flavor and aroma by the economical use of the following remarkably successful flavoring specialties:

OIL BRANDY IMITATION No. 08

OIL RUM JAMAICA IMITATION No. 017

OIL MINCE MEAT SPICE

Samples and particulars on request.

REALLY TOPS...

In our laboratories, scientific chemical knowledge and practical experience have combined to produce many a peak performance. Nowhere is this better illustrated than in our fine line of Maple and Vanilla Flavor Specialties, of which the following are really tops:

FRITZBRO TRUE MAPLE CONCENTRATE

FRITZBRO AROME MAPLE IMITATION

PURE VANILLA CONCENTRATE TENFOLD BOURBON

OLEORESIN VANILLA

EKOMO VANILLA IMITATION

FLAVOR COMPOUND No. 23274

BUTTER VANILLA IMITATION

Write for samples and recommended applications.

NUTTY, BUT NICE...

Nutmeats are a sure-fire consumer favorite—as the makers of cakes, candies and pudding desserts very well know. Their use of these popular ingredients is sometimes restricted, however, by the high cost of nutmeats and availability of supplies. To help lower costs and stretch limited supplies, many manufacturers are using our Imitation Nut Flavors in their formulations to very excellent advantage. Write us for samples and suggestions for using any of the following:

BLACK WALNUT
BUTTER PECAN
COCONUT
HAZELNUT
HICKORY NUT
MAPLE WALNUT
PEANUT
PECAN
PISTACHE

FRITZSCHE *Established* 1871 *Brothers, Inc.*

PORT AUTHORITY BUILDING, 76 NINTH AVENUE, NEW YORK 11, N. Y.

BRANCH OFFICES *and* *STOCKS: *Atlanta, Georgia, Boston, Massachusetts, *Chicago, Illinois, Cincinnati, Ohio, Cleveland, Ohio, *Los Angeles, California, Philadelphia, Pennsylvania, San Francisco, California, St. Louis, Missouri, *Toronto, Canada and *Mexico, D. F. FACTORY: Clifton, N. J.

Briefly, this ad illustrates why DEMPSTER-DUMPSTER SYSTEM

Container at right has cast iron bottom and inside walls are lined with fire brick. It handles hot skim off aluminum.

This Tilt Type Container was the result of a cost-cutting idea whereby a high temperature dusty product would be handled by a plant's Dempster-Dumpster. Container has cooling fins, counter-balanced hinged lid with 3-way locking device, 16" sliding gate valve and two sight-glass inspection openings.

Here is a Hopper Type Container with a top door for filling and two bottom discharge doors operated by rack and pinion. Another case where the Dempster-Dumpster System was applied to an additional problem to further reduce costs.

Container at right is just one of several different types we have designed to handle equipment, materials, packages, parcels, etc.

IN A NORMAL INSTALLATION the Dempster-Dumpster System is purchased by a plant because of its proved record for handling bulk materials at tremendous savings. This normal installation usually includes one truck mounted Dempster-Dumpster and any number of standard containers designed to meet the various requirements within the plant. In some cases, containers number 40 to 50. These containers can range in capacity up to 21 cu. yds., with all containers served by the one Dempster-Dumpster.

In the great majority of cases this basic installation is just a starter. Management men, constantly looking for lower operating costs, find numerous and amazing extra savings in the Dempster-Dumpster System. Once in service, transporting developments of every description come to light that supplement the original functions of the equipment. Your own men find easier, quicker and additional cost saving ideas for its use. Many even overshadow the original savings and the equipment becomes more and more indispensable.

Look over just a few of the "Special" containers illustrated in this ad. They are all the result of rough ideas that originated with the men in plants after a basic installation, then developed by our engineers. All ideas were stimulated by the powerful Dempster-Dumpster and its flexibility in picking up, hauling, setting down or dumping anything that needs transporting, at lower cost.

One man, the driver, and a few simple hydraulic controls in the cab of a Dempster-Dumpster, will become indispensable in your plant. It is just that in hundreds of plants of every description throughout the nation. Let one of our representatives give you details of installations. Manufactured exclusively by Dempster Brothers, Inc.

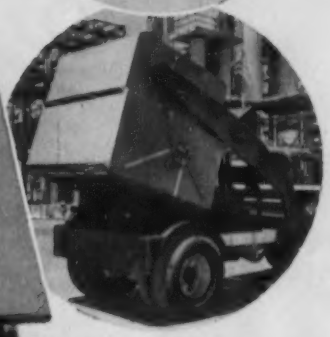
Above container is built with cast iron liner. The holes in outer wall are for cooling.

Here is one of several special drop bottom type containers equipped with couplers and ball bearing trucks for operation in train on rails.

THE DEMPSTER DUMPSTER SYSTEM

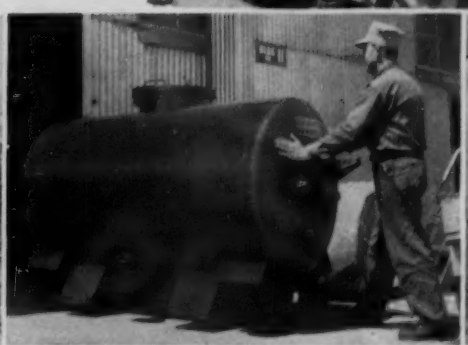
DEMPSTER BROTHERS

so many plants find the indispensable...

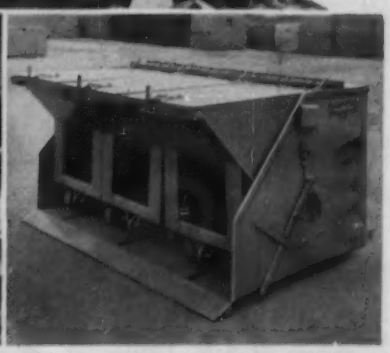


Two photos above show how all containers, regardless of design, are picked up and hauled. At destination materials are dumped from drop bottom containers as shown at left . . . from Tilt and Skip Type Containers by tilting. Any load, of course, may be set down intact.

This is a special adaptation whereby waste zinc slurry is pumped into two containers, which serve as settling tanks, enabling majority of the water to be decanted before sludge is transported and dumped at waste basin.



Tank Type Containers are available with or without casters in steel, aluminum, stainless steel, etc. Capacity ranges up to 1,200 gal. They may be lined with rubber, lead, highly resistance coatings, etc.



This is a master container with three 2 cu. yd. insert containers. Each insert container is provided with casters, counter-balanced spring-hinged lid for loading and dumping.

785 SHEA BLDG., KNOXVILLE 17, TENNESSEE

You're sure to be in

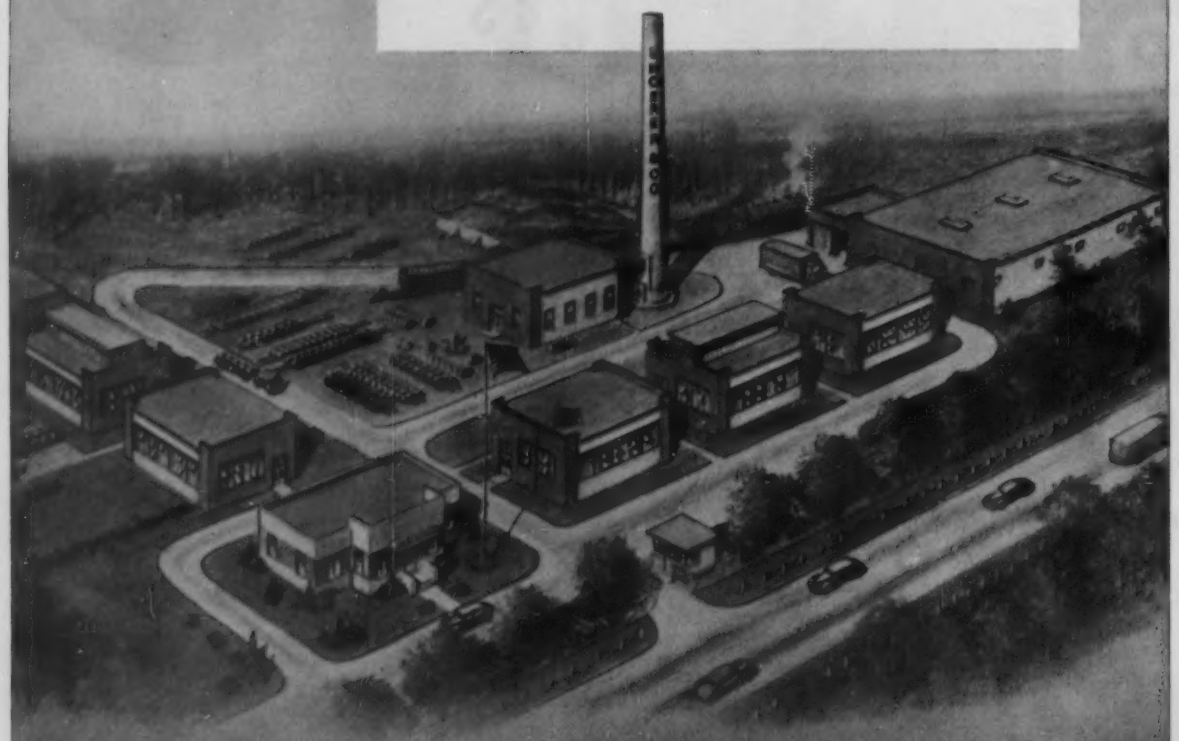
GOOD TASTE

when you specify

UNGERER

IMITATION HOT CASSIA OIL No. 3263

Another top quality product of the Ungerer laboratories. Samples and technical information on the use of this flavor in your product will be supplied on request.



Plant and Laboratories, Totowa, New Jersey

Ungerer & Co.

161 Avenue of the Americas, New York 13, N. Y.

CHICAGO • BOSTON • PHILADELPHIA • ST. LOUIS • LOS ANGELES • ATLANTA

Run SERVEL WATER CHILLERS on waste heat or waste steam!

Here's how to provide low-cost chilled water for your cooling needs

If you're letting waste heat or steam "go up in smoke," you're losing your cheapest source of chilled water.

Servel WATER CHILLERS utilize these waste products from any source to provide chilled water at *controlled* temperatures . . . chilled water you can use for industrial cooling, process cooling, or air conditioning in your plant.

These efficient Servel cooling units have no moving parts. They give you vibration-free operation and low upkeep. That's because Servel water chillers use an exclusive, modern absorption principle. No heavy-duty wiring required.

What's more, Servel water chillers are compact in size . . . and have low floor loading. That means you can put single or multiple installations in the most advantageous locations . . . on the roof, in the basement, or on any floor in between . . . even in a separate building.

Check these advantages against your cooling needs. Your Servel dealer will gladly supply details and engineering help. Or mail coupon today.

SERVEL WATER CHILLERS serve a wide variety of industries

1. Beverage Industry
2. Metal Plating Industry
3. Aluminum Industry
4. Steel Industry
5. Chemical Industry
6. Food Industry
7. Petroleum Industry
8. Dairy Industry
9. Printing Industry
10. Rubber Industry
11. Textile Industry
12. Wax Industry

Send coupon for details, now!

Servel

the name to watch for great advances in

AIR CONDITIONING ✓ REFRIGERATION

SERVEL, INC., Dept. FE-85, Evansville 20, Indiana

Please send me specifications and full information on Servel water chillers.

Name_____

Firm_____

Address_____

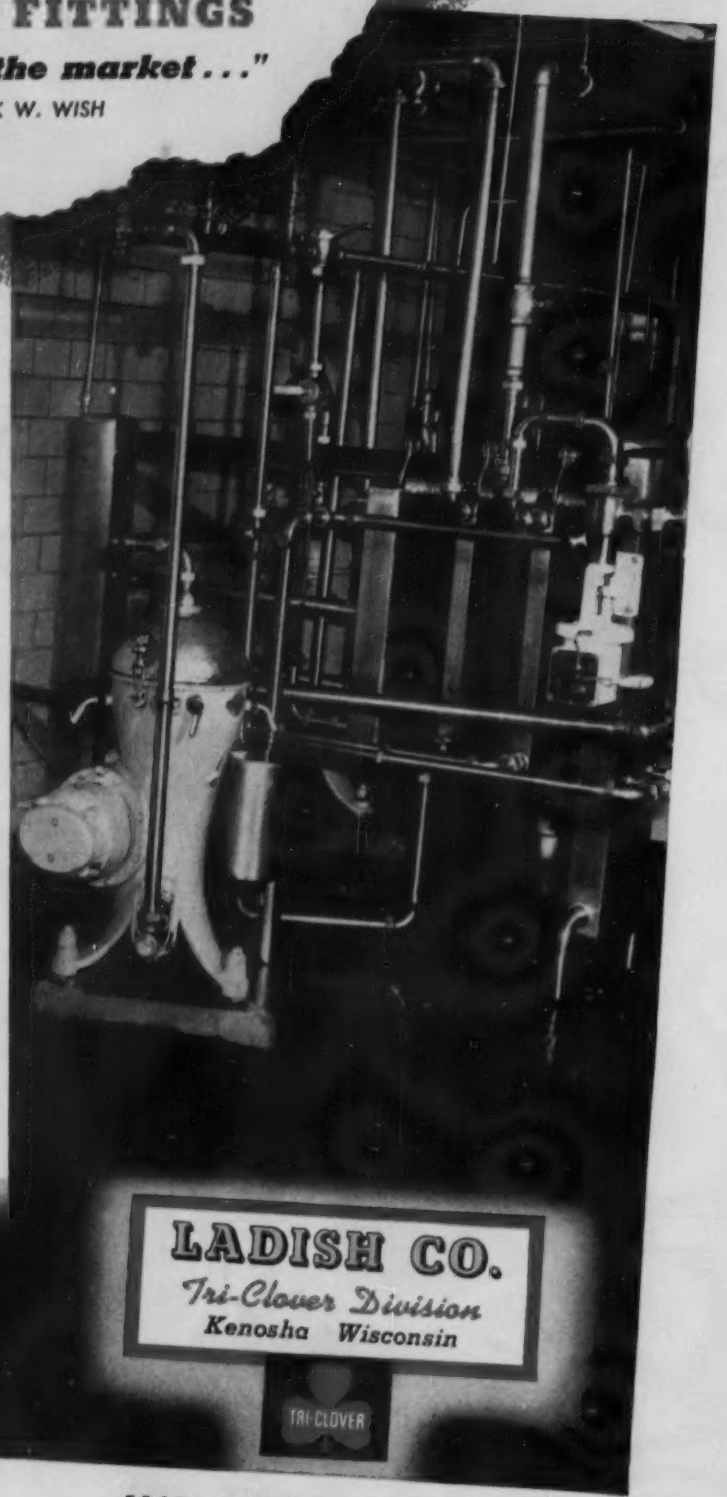
City_____ Zone_____

County_____ State_____

For more information, use coupon on last page.

"In my book TRI-CLOVER VALVES and FITTINGS *are the best on the market . . ."*

says FRANK W. WISH
of HOPEWELL DAIRY FARM



● *". . . Although we have been cleaning all equipment in place since the summer of 1953, we have noticed no pitting of our Tri-Clover valves or fittings . . . In my book, they are the best on the market."*

The above statement was taken from a letter written to us by Frank W. Wish of the Hopewell Dairy Farm, Bellefontaine, Ohio. Mr. Wish also adds, *"At the present time we are further modernizing our plant and I'm interested in any new designs or suggestions you might have which would help us."*

Thanks, Mr. Wish. We are always happy to receive comments from Tri-Clover users. And we always like to pass these comments on so that other dairy, food and beverage plants may profit from the success of experienced plant operators like yourself. In regard to new designs or suggestions, we would like to remind you that our engineering staff is always at your disposal to help solve your specific problems and work out special designs where needed.

And another important thing, we are equipped to meet your complete requirements. You can depend on Tri-Clover as your one reliable source for all types of sanitary fittings, valves, pumps, tubing or allied specialties.

8255

LADISH CO.
Tri-Clover Division
Kenosha Wisconsin

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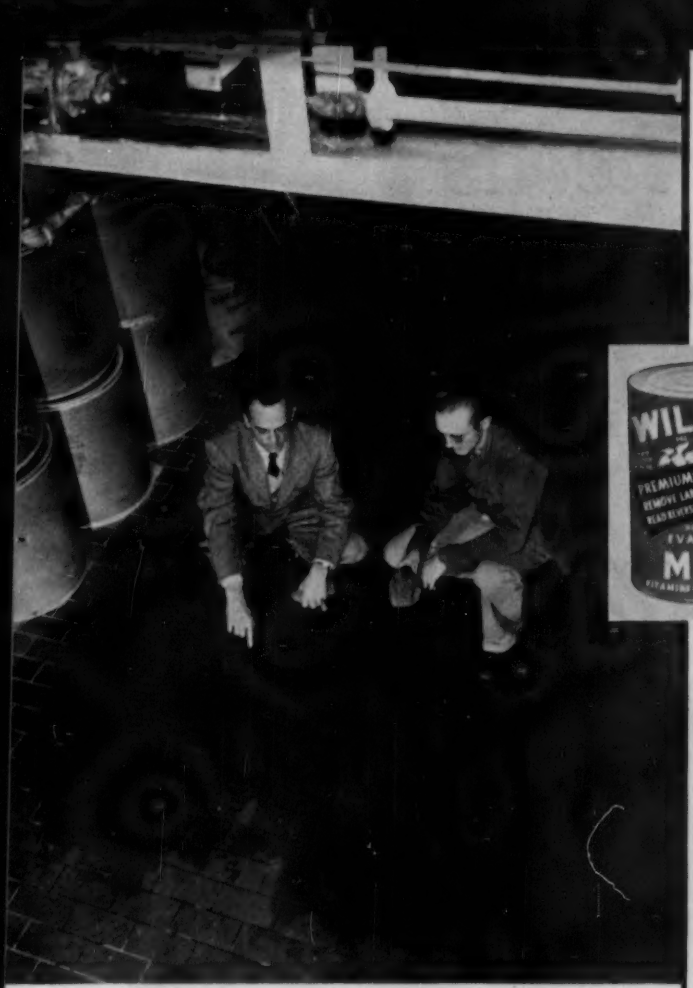
Cable: TRICLO, CHICAGO

For more information, use coupon on last page.

STANODRIP *Oil whips lubrication problem at Wilson Milk Company*



Taylor Wiham, Wilson Milk Company (right), and John Pirtle, Standard Oil lubrication specialist, inspect oil stain on otherwise spotless floor, the result of previous oil leakage from overhead hydraulic bin loader. Leakage has been eliminated through use of STANODRIP Oil No. 29. Helping customers with lubrication problems is something John Pirtle is well equipped for. John has an engineering degree from Rose Polytechnic Institute, has completed Standard Sales Engineering School and has a number of years of field technical service experience. Customers find this experience and training pay off for them.

MANAGEMENT OF THE Wilson Milk Company plant, Sheridan, Indiana, had a serious lubrication problem. STANODRIP Oil solved it.

In overhead bin loaders, hydraulic rams push powdered milk along conveyor chute to weighing machine. Leakage of lubricant from rams on the floor below caused a sanitary and safety problem. Packings were replaced every two months but leakage often recurred as early as two weeks after packing replacement.

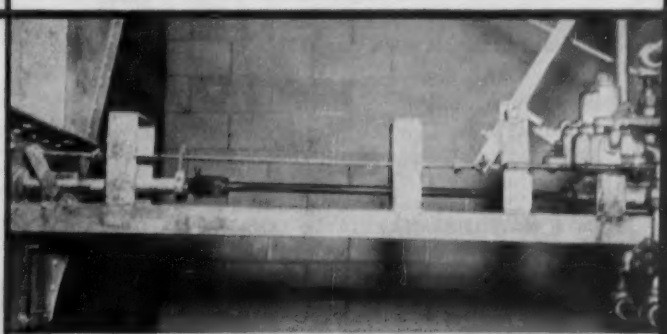
Then Mr. Taylor Wiham, Assistant Superintendent, called in John Pirtle, Standard Oil Industrial lubrication specialist. Mr. Wiham asked about STANODRIP Oil and its possible use as a solution to this lubrication problem. Decision was made to convert to STANODRIP Oil No. 29. Old oil was removed, packings replaced and STANODRIP installed.

In more than 8 months since installation of STANODRIP Oil, there has been no leakage, no packing replacement. Hydraulic rams are lubricated without oil dripping or creeping.

Maybe STANODRIP Oil can serve you as it has Wilson Milk Company. Find out. In the Midwest, call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

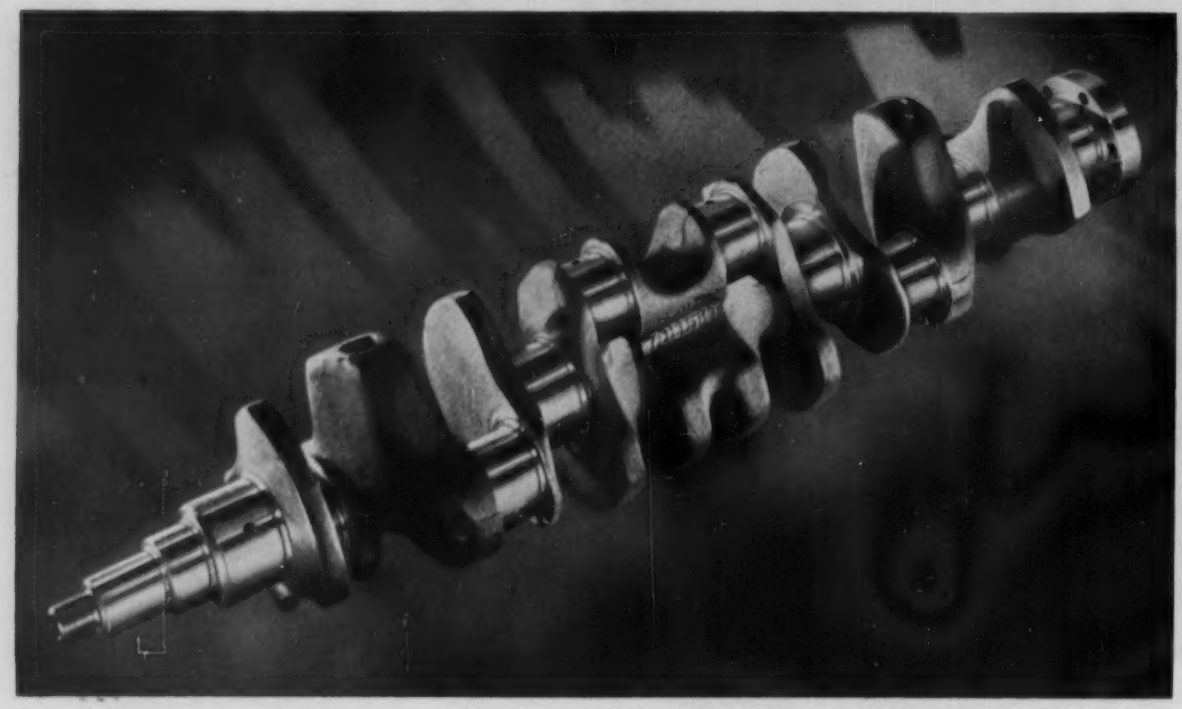
STANDARD

STANDARD OIL COMPANY
(Indiana)



Three bin loaders like the one shown here dripped oil until converted to STANODRIP. No leaks have occurred in 8 months since. Previously, packings were replaced every two months. Even then leakage often recurred as early as two weeks after repacking.

A truck engine needs a "backbone" like this—



From fiery forges and precision machines come extra-strong INTERNATIONAL crankshafts. Those used in light-duty models are 17% heavier than the average of comparable forged or cast alloy 6-cylinder designs—for maximum strength and rigidity, long life.

to save you the BIG money

Crankshafts are just one example of INTERNATIONAL all-truck engineering that saves you the *big money.*

Of the five leading makes, only INTERNATIONAL offers a complete line that is *all-truck built* . . . with no automobile engines or components asked to do a truck job.

You save the most with an INTERNATIONAL that's *all-truck built* to last longer. It earns its keep in lower over-the-years operating and maintenance cost. It pays for itself in use. It saves you—earns you—the *big money.*

Keeping costs down has made INTERNATIONAL the heavy-duty leader for 23 straight years. Let your INTERNATIONAL Dealer or Branch show you the right INTERNATIONAL for your job—built to save you the BIG money.

There's an INTERNATIONAL *exactly right* for every provision and chain store hauling job—*all-truck built to save you the BIG money.* 45 conventional and COE 4- and 6-wheel models from 14,000 to 30,000 lbs. GVW, including 3 all-new METRO® "walk-in"-cab models.

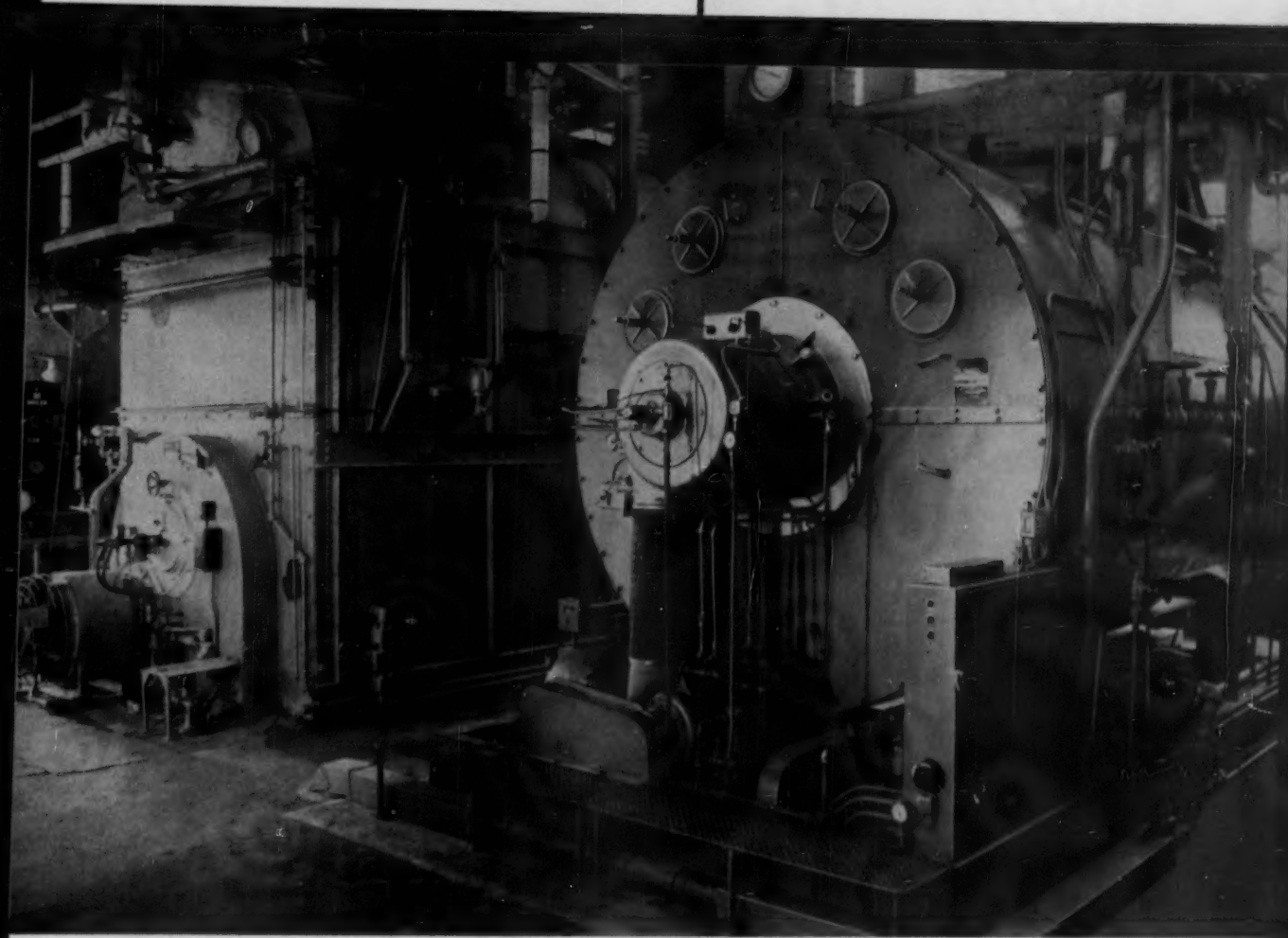
INTERNATIONAL HARVESTER COMPANY • CHICAGO

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Top TV Comedy! Ronald Colman and Benita Hume in "The Halls of Ivy," CBS-TV, Tuesdays, 8:30 p.m., EDT

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers



Why was this *Powermaster*® switched from "Stand-by" to Full-Time Duty?

You get MORE than fuel economy with Powermaster

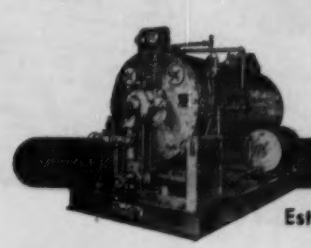
- ★ Low-cost, space-saving installation
- ★ Fast steaming
- ★ Instant response to load changes
- ★ Quick fuel change-overs
- ★ Clean, dry steam
- ★ Automatic operating and safety controls
- ★ Clean, quiet operation
- ★ Smokeless combustion
- ★ One-source responsibility for complete unit
- ★ Nation-wide factory-trained service organization
- ★ Pay-As-You-SAVE Purchase Plan

Originally purchased as a stand-by unit to supplement two older water-tube boilers, this 500 HP heavy oil *Powermaster* Packaged Automatic Boiler was quickly put on full-time duty by an Eastern rubber goods company.

The reason is *Powermaster's* fuel economy. While the *Powermaster* now carries the plant load continuously, the older boilers, one of which is shown at left above, are operated only when necessary.

Powermaster's cost-cutting and worry-saving advantages can be yours quickly and easily under Orr & Sembower's new Pay-As-You-SAVE Purchase Plan.

Write for Bulletin 1220.



Powermaster®

PACKAGED AUTOMATIC BOILERS

In sizes to 500 HP; pressures to 250 psi.

ORR & SEMBOWER, INC.

Established 1885 • Morgantown Road, Reading, Pa.

A leading producer of Vitamin A
for the food field
solves your color problems with this

BIG NEWS

* * *

Pfizer now offers
2 important coloring agents

- PFIZER VEGETABLE COLOR
- PFIZER BETA CAROTENE

DOLLAR RESERVES ...LINE IN BRITAIN

NATIONAL BANKS HOLD 109 BILLION

Controller Reports Assets Up Nearly 5 Billion in Year Ended Last June 30

WASHINGTON, Sept. 2—Total assets of national banks on June 30 amounted to $109,000,000,000, nearly $5,000,000,000 greater than a year earlier, Hon. M. Gidney, Comptroller of the Currency, re-...ed today.

...posits of the banks on June ...he close of the fiscal year, ... $99,645,000,000, an increase ...2,300,000,000 since April, and ...nearly $5,000,000,000 in the ...

...cluded in the recent deposit ...ures were demand deposits of ...ividuals, partnerships and ...porations of $53,800,000,000, ...ich decreased $102,000,000 ...m April 15, and time deposits ...ividuals, partnerships, and ...ns of $24,000,000,000. ...shows ...eased $553,000,000 from ...

...of the United States ...t $3,600,000,000, in- ...147,000,000 since April ... states and political ... $7,000,000,000, in- ...,000,000, and deposits ...,000,000,000, increased ... Postal savings were ...00 and certified cashiers' ... were $1,400,000,00.

Loans and Discounts Up

...loans and discounts o... were $37,800,000,000, a... ...79,000,000 since Apr... ...se of $1,200,000,00... since June 30, 195... ...nd industrial loa... ...000,000, a decrea... ...0 since April. Loa... ...ate, $9,200,000,000, we... ...cent since April. ...loans, including c... ...ns to individuals, lo... ...s to brokers and deal... ...ers for the purpose ...ing and carrying sec... ...d to banks, etc., amou... ...,000,000, an increas... ...y 1 per cent since April, ...were up 11 per cent in the ... The percentage of loans and ...counts to total assets on Jun... was 34.69, in comparison ... 35.27 in April and 35.23 a... earlier.

Investments of the ban... United States Government ...gations on June 30 aggre... $35,900,000,000 (including ... ...400,000,000 guaranteed ... ...tions), an increase of $1,30... ...000 since April. These inves... were 23 per cent of total ...

Other bonds, stocks ... ...rities were $9,000,000,000 ... included obligations of st... political subdivisions of ... ...000,000, and were $10... more than in April and $... ...000 more than in June of ... Total securities held, a...

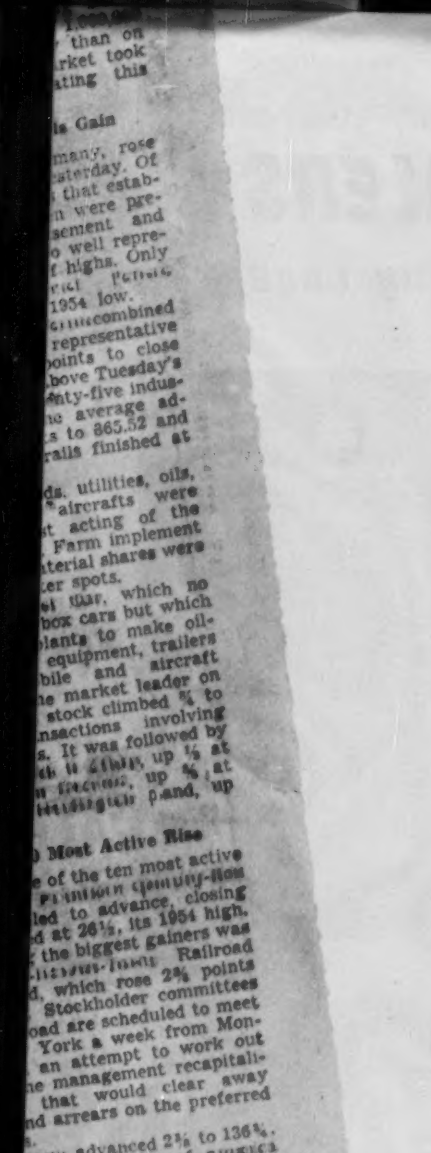
...NANCIAL AND BUSINESS SIDELIGHTS OF THE DAY

...economic frustra... ...g for Coatzacoalcos, ...xican village that ...the Gulf of Mexico ...mus of Tehuantepec. ...days of Hernando ...s conquistadores un... ...n of the Panama

during the first eight months of this year. The current issue of Ridk's World Currency Report estimates that gold sales in all international trading centers amounted to $750,000,000 from Jan. 1 through Aug. 31. That would be about 12 per cent greater than

need for the Federal Reserve to inject bank funds into the market to meet general needs of the economy. The reason seems to be rather a monetary stringency in this and other major financial centers. Most of the excess bank

occasion to report that the Fourteenth Street store chalked up record sales last month. He said that in August 92 per cent of Pdoih's departments outstripped sales for August, 1953. Mr. P... ohni added that the heaviest sales



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stock climbed ⅝ to
nsactions involving
s. It was followed by
th it climbs, up ⅛ at
n Electric, up ⅝ at
Studebaker, up ⅛ and, up

Most Active Rise

e of the ten most active
Pittston Company rose
led to advance, closing
d at 26½, its 1954 high,
the biggest gainers was
Illinois Central Railroad
d, which rose 2⅝ points
Stockholder committees
oad are scheduled to meet
York a week from Mon-
an attempt to work out
he management recapitali-
that would clear away
nd arrears on the preferred
s.
Tidal advanced 2⅝ to 136¾.
Texas Company of America
2⅝. Dorsey Otabeard was
eature of the oils with a gain
⅝. On news that directors
omitted the dividend, Amer-

ntinued on Page 27, Column 6

Now Coatzacoalcos is making
bid to become one of Mexico's
reat ports. All through the
ears its fortune lay hidden be-
eath the surrounding jungle in
he form of sulphur embedded in
imestone. Sufficient quantities
ave been found to tag the area
s a major new source of sulphur
for the world market.
Three American companies are
rushing to completion facilities
to handle rail and sea shipments
of sulphur of an estimated 1,000,-
000 tons a year. Coatzacoalcos is
to be the key shipping port for
these shipments. The companies
are Mexican Gulf Sulphur Com-
pany, Gulf Sulphur Company and
Pan American Sulphur.

Gold

To meet a vitamin and color need of the food industry, Chas. Pfizer & Co., Inc. now makes available two important coloring agents—PFIZER VEGETABLE COLOR and PFIZER BETA CAROTENE. Each can be obtained preblended with Pfizer Vitamin A to your specifications—or alone, as straight coloring agents—whichever best meets your requirements. Pfizer Vegetable Color and Pfizer Beta Carotene both give you a natural yellow color that is highly stable. When they are blended with Pfizer Vitamin A, you fortify and color in one easy operation.

PFIZER VEGETABLE COLOR—an oil-soluble 20% suspension of microcrystalline annatto color in refined winterized cottonseed oil. Pfizer Vegetable Color is very stable and also highly compatible with Vitamin A. Its excellent coloring properties are apparent when used alone and when blended with Pfizer Vitamin A.

PFIZER BETA CAROTENE—A stable, nutritional coloring agent that imparts a true natural color. Pfizer Beta Carotene has high Vitamin A activity and can be custom-blended with additional Pfizer Vitamin A for full nutritional value. Pfizer Beta Carotene dissolves readily and gives uniform color.

MAKE PFIZER YOUR SINGLE SOURCE FOR BOTH COLOR AND VITAMINS—When ordering either of these two coloring agents from Pfizer, you save time, trouble and money by also ordering your Vitamin A. That way they can be custom-blended and packaged for you—ready to give your products sales-winning appeal. Try these easy-to-use Pfizer coloring agents. Write today for samples made up to your specifications.

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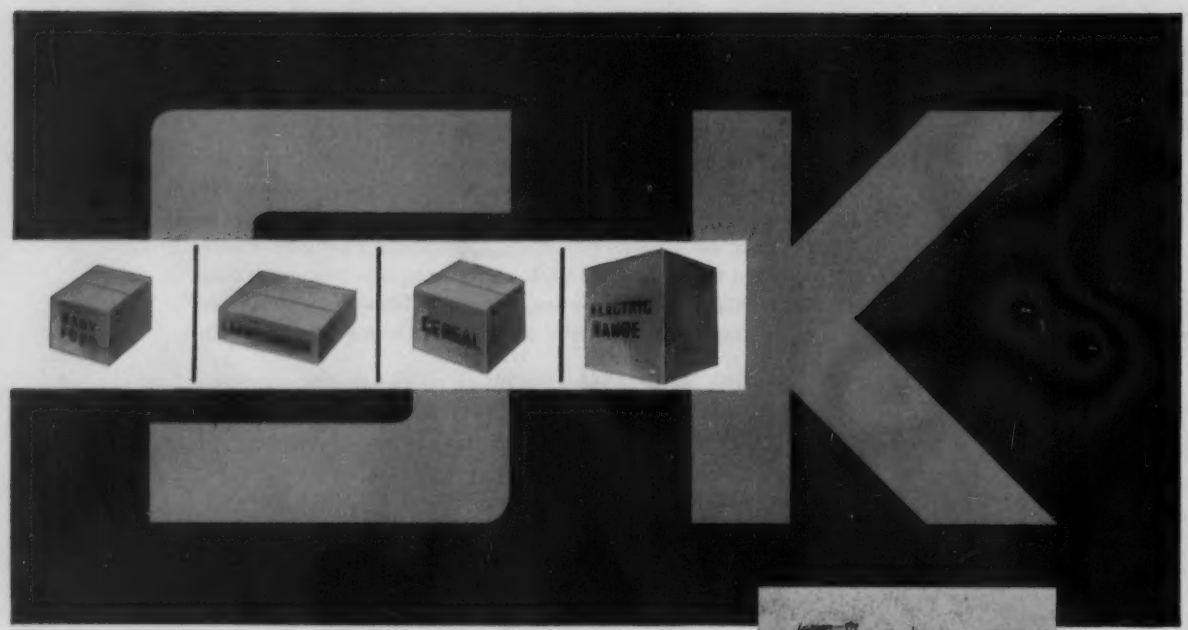
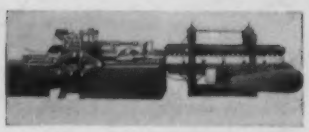
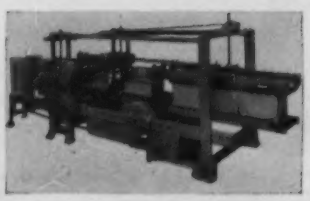
Pioneers and Leading Manufacturers of Vitamins **Pfizer**

S-K GLUERS and SEALERS

The best way to close ANY shipping case







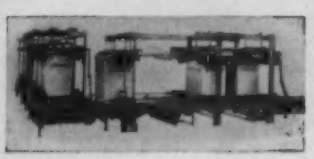
Standard-Knapp Gluers and Sealers are built to handle any fiber or corrugated shipping case, big or little, long or short. S-K Gluers and Sealers range from hand fed compression units to fully automatic machines that detect and adjust for a variety of case sizes.

With S-K Gluers and Sealers you are assured of strongly bonded, neat, and uniformly squared cases. Gluing is the most economical way to close a case, and remember, glued cases are easy and fast to open.

FOR EFFICIENTLY INTEGRATED operations, use Standard-Knapp Case Packers in combination with Standard-Knapp Gluers and Sealers. S-K packers assure savings on can, bottle, carton, bag or glass container lines.

For complete information on Standard-Knapp Gluers and Sealers write Dept. F. Or ask for your copy of the Emhart Condensed Catalog of over 275 machines.

Only the best is good enough



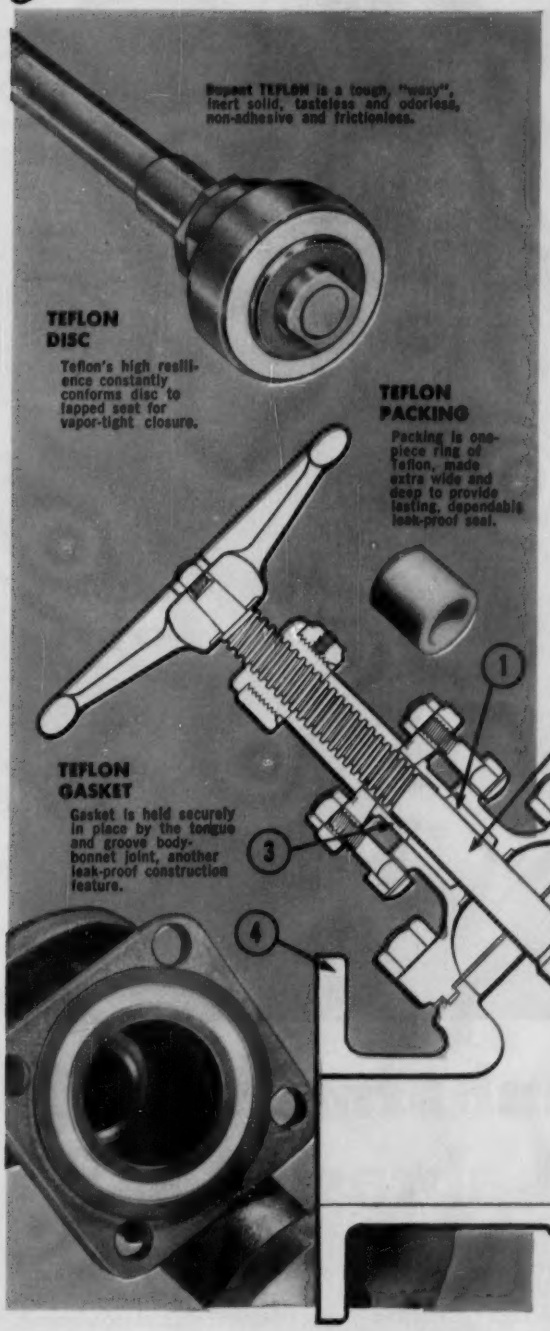
STANDARD-KNAPP

DIVISION OF EMHART MFG. CO.

PORTLAND, CONNECTICUT

For more information, use coupon on last page.

Jenkins designed for trouble-free performance... a


Dupont TEFLON is a tough, "waxy", inert solid, tasteless and odorless, non-adhesive and frictionless.
TEFLON DISC
Teflon's high resilience constantly conforms disc to lapped seat for vapor-tight closure.
TEFLON PACKING
Packing is one-piece ring of Teflon, made extra wide and deep to provide lasting, dependable leak-proof seal.
TEFLON GASKET
Gasket is held securely in place by the tongue and groove body-bonnet joint, another leak-proof construction feature.
1
2
3
4

STAINLESS STEEL "Y"

to lower costs in a wider range of

CORROSIVE SERVICES

For food and chemical plants, and similar services, Jenkins Fig. 1335 "Y" Globe offers many advanced features that will lower operating costs and keep your processing lines trouble-free. The disc, packing, and gasket are tough, resilient Teflon. Tasteless and odorless, it eliminates problems of contamination.

The "Y" pattern permits full flow, nearly equal to that of a gate valve, and also provides the vapor-tight closure and the ease of disc renewal of a globe valve.

Fig. 1335 offers extra value by any test . . . *initial cost, operating efficiency, low maintenance.* You can convert this extra value into *extra savings* on your toughest corrosive services. Call your Jenkins Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17.

FULL, FREE FLOW through Fig. 1335 is nearly equal to flow through a gate valve.

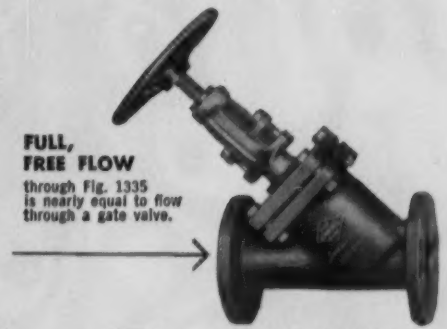


Fig. 1335 "Y" GLOBE
150 lbs. O.W.G. at 500°F
230 lbs. O.W.G. at 100°F
Sizes 1" to 4"

(1) **Packing Box**—Exceptionally deep and wide to hold optimum size packing.

(2) **Spindle**—Polished shank, long-operating threads, bevel shoulder for backseating.

(3) **Gland**—Two-piece for equalized pressure, tight seal.

(4) **Flanges**—Conform to M.S.S. Standard Practice S.P.42 Specifications.

JENKINS STAINLESS STEEL VALVE BOOKLET illustrates and describes wide range of Jenkins Globe, Gate, Check, and Y Valves, includes selection data, survey forms. Ask for Form 200-A.

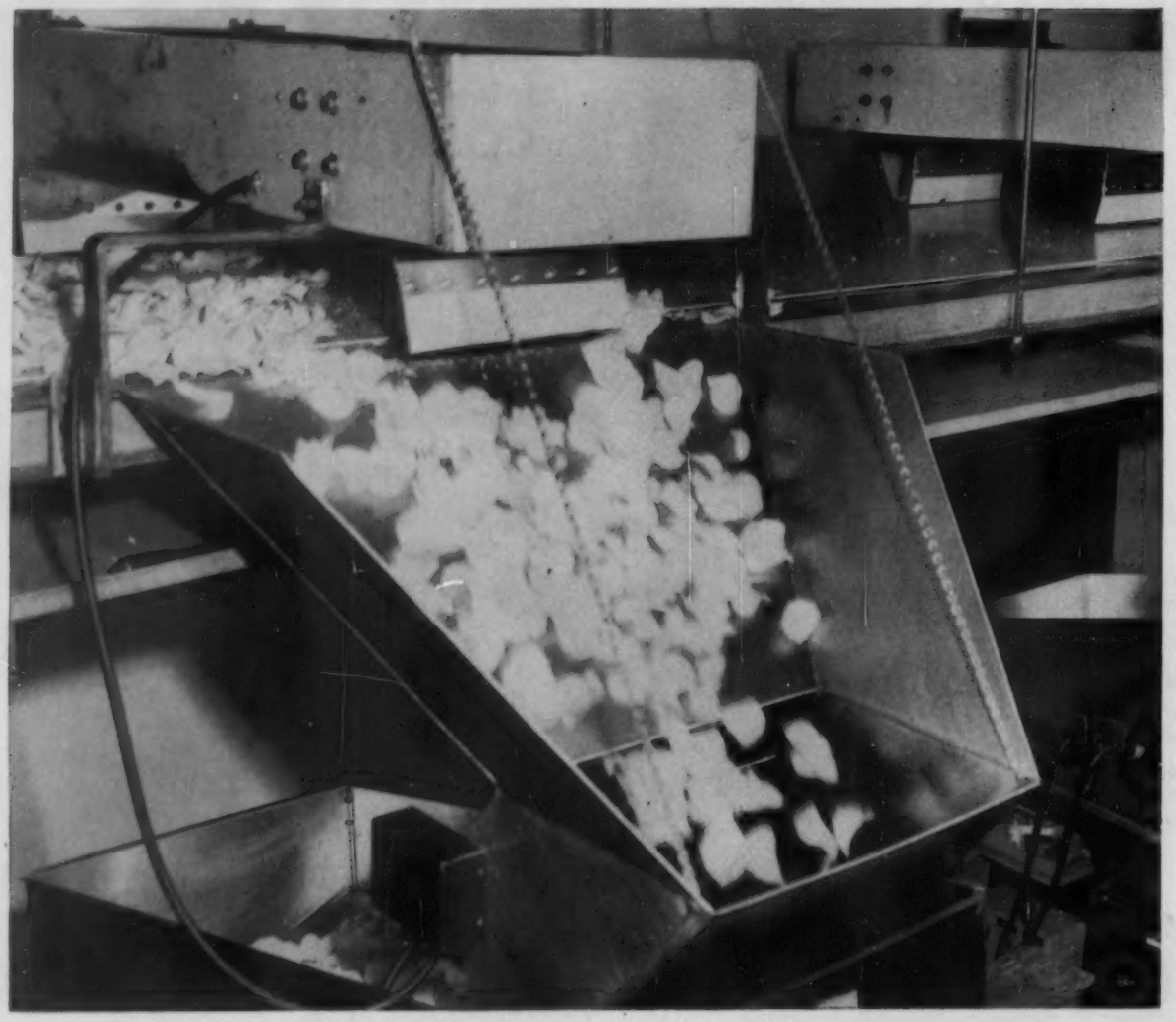
JENKINS VALVES

LOOK FOR THE JENKINS DIAMOND

SINCE 1864 MADE BY JENKINS

Jenkins Bros.

B. F. Goodrich announces



Koroseal belt unharmed by warm grease and abrasive salt

HERE's the new Koroseal belt that is making important savings in food processing plants, bakeries and other places like this potato chip plant, where grease and abrasive salt used to shorten the life of canvas, rubber or plastic-coated belts.

Because it's made of Koroseal flexible material, this new B. F. Goodrich belt is not affected by cooking oils, animal fats, most acids—and it stands hard use, rough handling and just about everything else that ruins most materials.

Unlike belts that are just coated with plastic, Koroseal is used throughout this B. F. Goodrich belt, and so resists cracking and peeling, never gets soft or sticky. Oil doesn't soak into Koroseal's tough surface, food particles can't grind in. That's why this belt is so easy to clean. A quick wipe with a damp cloth and detergent, and the Koroseal belt is as clean and new looking as ever.

Other new belts, developed by B. F. Goodrich for food handling, include a thin white Koroseal belt and an oil resisting belt, called Highseal, that's made of a new type of rubber compound. Its "sight-saving" green color reduces glare and eye strain on packaging and inspection lines.

Find out more about these longer-lasting, work-saving food handling belts. Have your BFG distributor survey your belting needs and recommend the right B. F. Goodrich belt for your process. If you don't know the distributor nearest you, write us and we'll have him call you. *The B. F. Goodrich Company, Department M-435, Akron 18, Ohio.*

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YES, not only does Link-Belt make bucket elevators for all types of material — there is specialization right down to spacing of buckets . . . the types of take-ups and hoods for utmost effectiveness. In addition, Link-Belt offers a wide range of buckets for further assurance of maximum efficiency in handling your materials.

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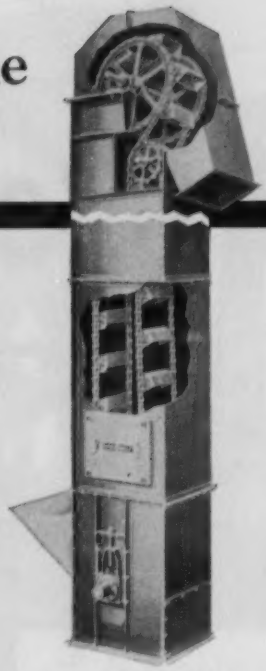
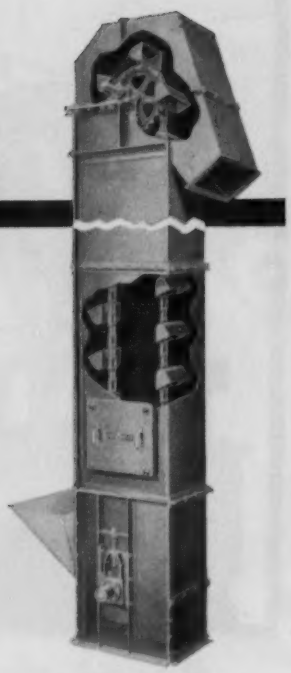
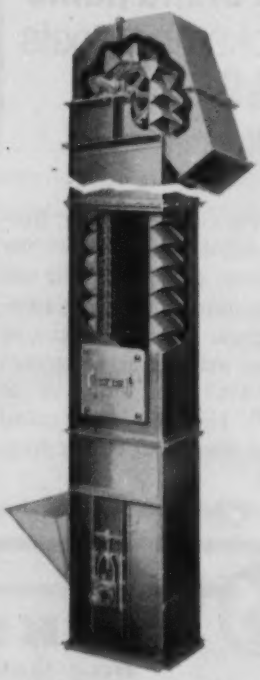


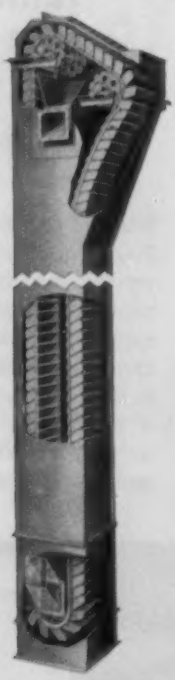
Positive discharge for light, fluffy and fragile materials or materials that have a tendency to stick to the buckets.



Centrifugal discharge for free-flowing, fine or loose materials with small to medium lumps.



Continuous discharge for range of materials — light to heavy, small to large, abrasive lumps.



Internal discharge for gentle handling of small articles such as pellets, seeds, castings.

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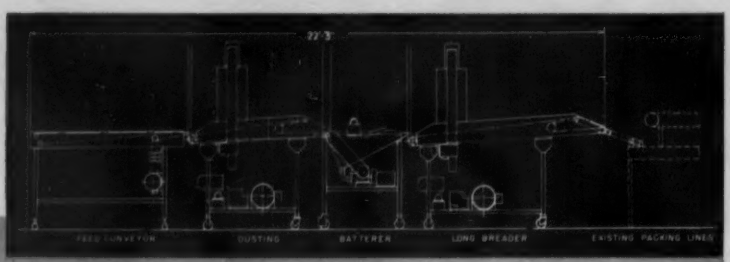

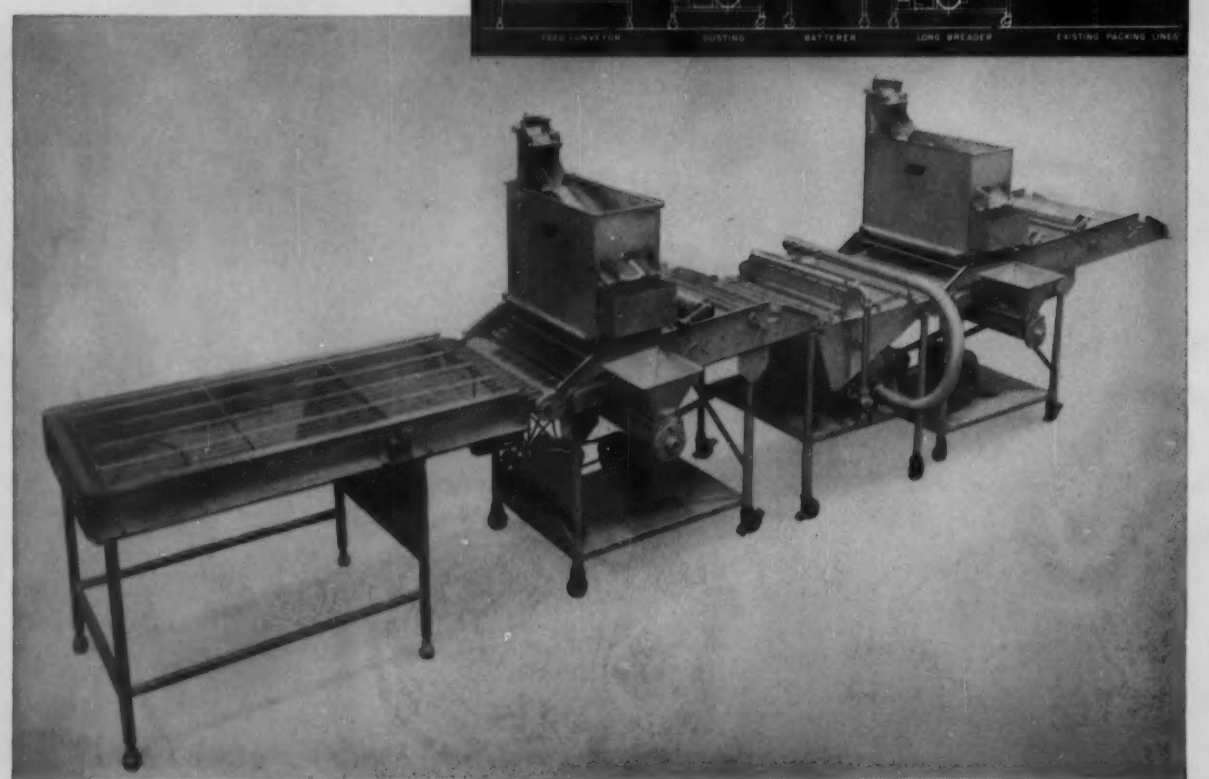

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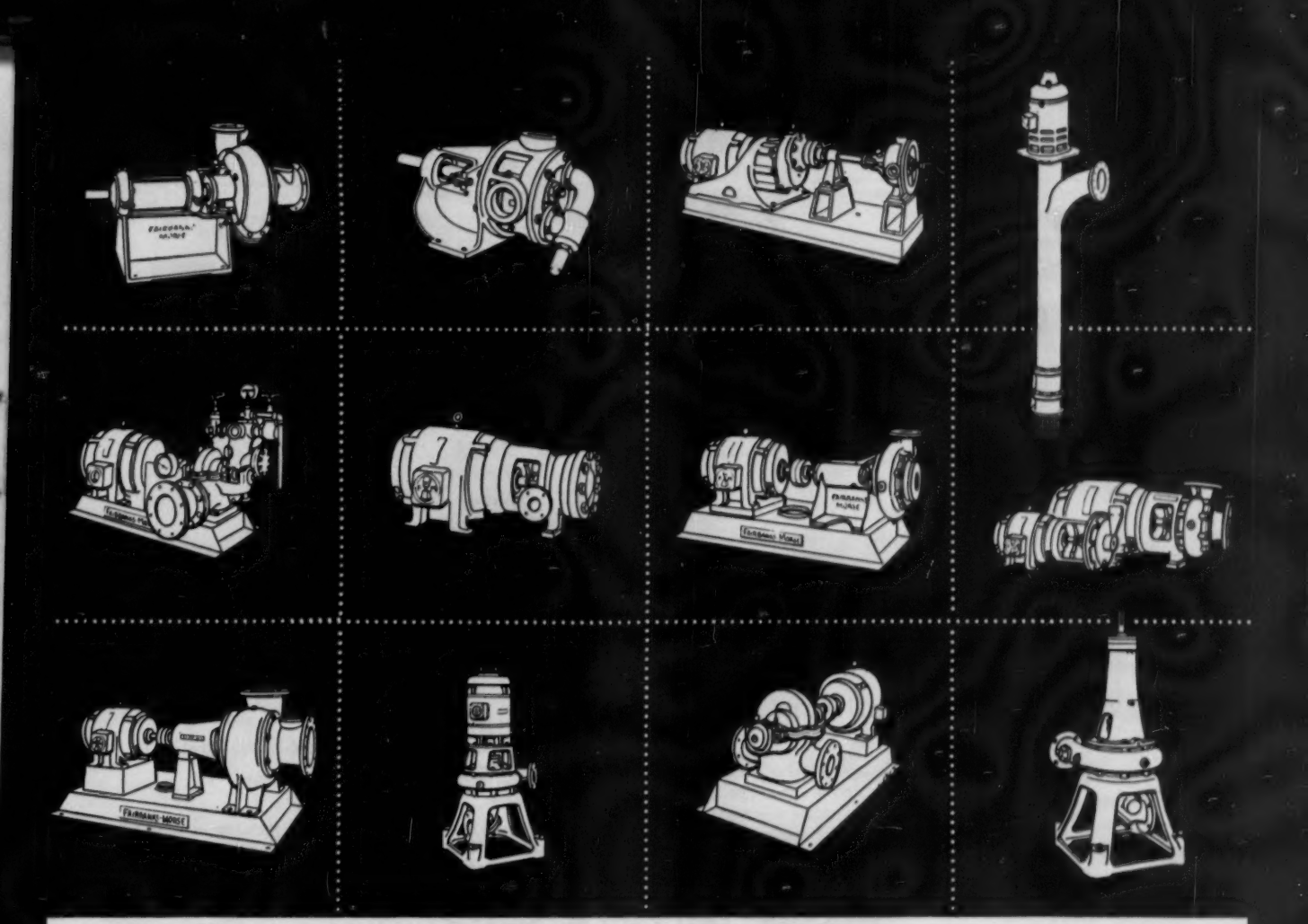

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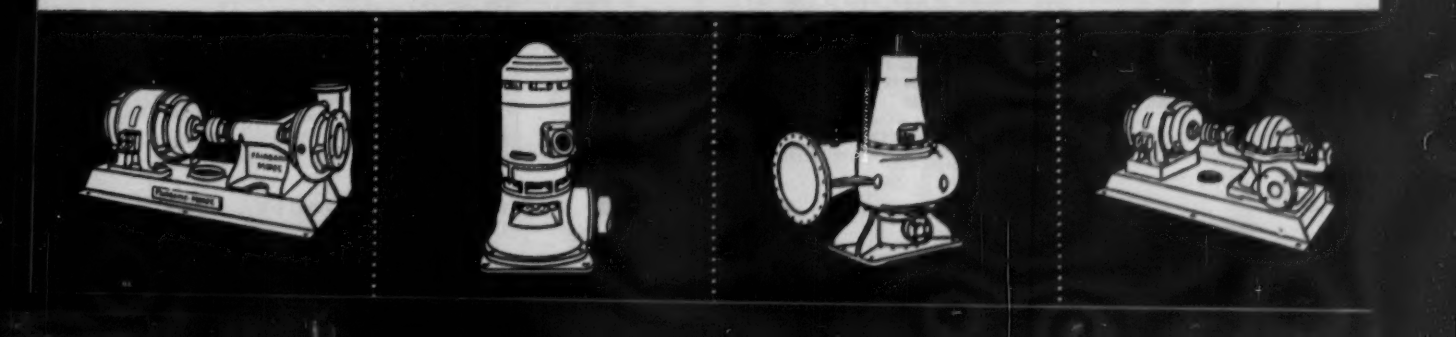

IT'S NEW!

Beta 'Roche' CAROTENE

Gives foods true, natural yellow color and vitamin A potency

Processors of margarine, shortening, butter, cheese, yellow baked goods, confectionery and edible oils will be especially interested in the new and exclusive product of original Roche research: beta carotene 'Roche.'

Beta carotene 'Roche' has many advantages:

NATURAL COLORING

Beta carotene is the natural coloring matter of butter and other dairy products and is a constituent of cereal grains, alfalfa, carrots, and other vegetation. 'Roche' beta carotene imparts a *true* natural yellow color without any tinge of green. It does not change to a reddish color as do some vegetable pigments during storage.

ADDS NUTRITIONAL VALUE

Theoretically, one gram of pure beta carotene is equivalent to 1.67 million U.S.P. units of vitamin A. High retention of beta carotene-vitamin A activity is achieved in baked goods and other foods when margarine and shortening containing added beta carotene 'Roche' are used.

COLOR STABILITY

Extensive laboratory data show excellent color stability of margarine, butter, shortening, cheese, edible oils and yellow bakery products which were colored with beta carotene 'Roche.'

UNIFORMITY

The high degree of purity and color stability ensures uniform and constant intensity of color when using equal amounts per batch.

USAGE

Beta carotene 'Roche' is ideal for use in the following foods because it gives them *natural*, yellow color and vitamin A potency:

Margarine	Shortening
Butter	Cheese
Yellow bakery products	Confections
Edible Oils	

Detailed information about the application of beta carotene 'Roche' is available in a technical brochure. Ask your Roche salesman or write the Vitamin Division for this publication and for samples.

TECHNICAL INFORMATION

Crystalline beta carotene 'Roche' is in the all trans form

Empirical Formula: $C_{40}H_{56}$
Molecular Weight: 536.85
Melting Point: 183.0
Appearance: Red-violet platelets

Solubility in Edible Oils:

At room temperature	about 0.08%
At 60 C.	about 0.2 %
At 100 C.	about 0.8 %

Biological Properties

0.6 microgram beta carotene: 1.0 units of vitamin A
1.0 gram beta carotene: 1,666,666 + U.S.P. units of vitamin A

PACKAGING

33-pound steel pails, double Synthetasine lined, with removable-replaceable-leverlok cover.

3-pound triple-tite temperpruf metal cans.

Batch size cans of Vitamin A and Beta Carotene 'Roche' blended in vegetable oil to your specifications.

24% Semi-solid Suspension of Beta Carotene 'Roche'
400,000 U.S.P. units per gram 'Roche' beta carotene in vegetable oils.

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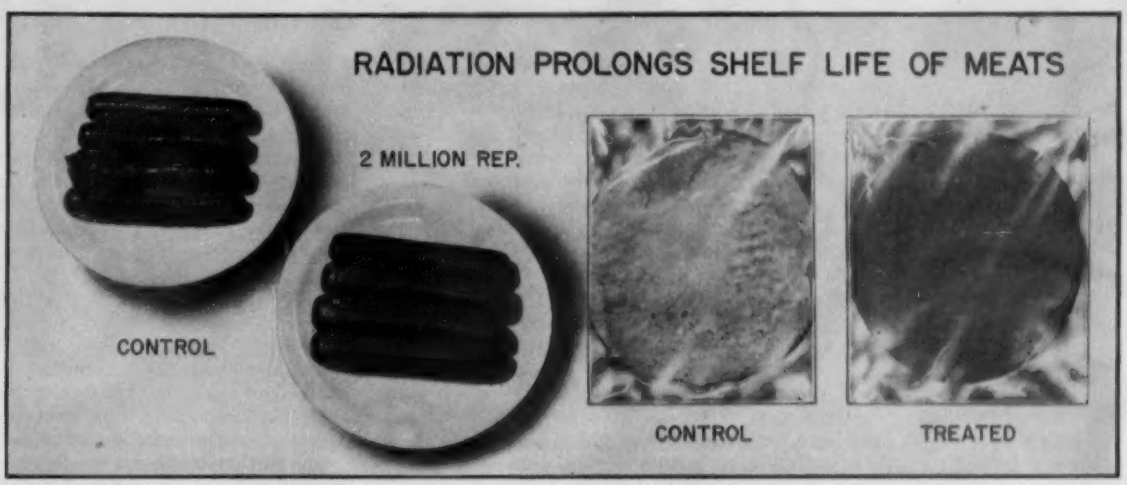


CONTROL SAMPLES quickly discolored, molded, and slimed. But irradiated franks (2,000,000 rep., gamma) and wrapped bologna (100,000 rep., GE electron accelerator) showed no spoilage after months of room-temperature storage.

FOOD-RADIATION ROUNDUP

Strategies of Research, Findings to Date Disclosed by QMC Experts

Six-point attack grapples with elusive problems of flavor, odor, color, and texture changes . . . Eventual commercial adaptations envisioned . . . Costs weighed . . . Actual results with wide variety of fruits, vegetables, meats and other foods

RIDDING the fighting man's front-line rations of their old elements of monotony has been one of the big jobs of the Quartermaster Corps.

And that's why QMC immediately mounted a vigorous exploration of the possibilities of radiation sterilization of foods, since means may thus eventually be realized to assure fresher meals for soldiers at the front.

Impetus to this research—being pursued by Food & Container Institute of the Corps in cooperation with industrial firms and research centers—was the tremendous lift in GI morale achieved during Korean hostilities with perishable holiday meals.

Accordingly, the status of radiation sterilization of foods was given a thorough airing at the recent Chicago meeting of the Research & Development Associates, Food & Container Institute.

With R. G. Tischer, director, Food Laboratories, QMFCI, presiding, a discussion panel was convened. It included as members Capt. R. Pomerantz, radiation sterilization officer; Dr. Bruce H. Morgan, project chief; and Lt. Col. B. S. Evans, Jr., CmlC, nuclear effects engineer—all with the QMFCI's Radiation Sterilization Project.

The first two named dealt, respectively, with the scope of the research and specific food effects (accompanying article), while the latter delved into the various radiation sources being employed (to be covered in a special article in a forthcoming issue of FOOD ENGINEERING).

Scope of Investigation Is Expanding

R. POMERANTZ

Current efforts of the project are directed to overcome objectionable alterations in the flavor, odor, color, and texture of foods completely sterilized by radiation.

More than three-fourths of the nation's research on radiation sterilization is being carried out within the Department of Army program. Cooperating are over 40 research groups, representing industry, quasi-industry, academic, and government laboratories.

Radiation sources are distributed

throughout the country, with the center of coordination for research and radiation at the Food & Container Institute, Chicago.

Contract Program

At present, the program is being carried out on contract basis to accomplish the following:

1. Determine the mechanism of quality losses.
2. Develop techniques to prevent quality losses.
3. Employ sources of radiation and study their physical effects.
4. Study microbiology and microbial products.
5. Evaluate resistance of enzyme systems.
6. Investigate surface or partial irradiation treatments.

The participants in the above six categories form an imposing roster.*

Feeding Tests

The Surgeon General's broad contract research program is set up to study the toxicity and nutritive value of radiated foods. Designed are comprehensive studies involving the test feeding of irradiated foods to rats, mice, dogs, chickens, monkeys, and humans.

Although a bit too early, the Surgeon General has advised the Institute that short-term feeding data thus far collected seem to suggest no toxicity of radiated foods.

Testing irradiated foods on human volunteers, which started several months ago, should yield important information.

Objectives Examined

From the inception of this project, the Institute has fashioned its activities to promote early acceptance of suitable technology and radiation sterilization by the food industry.

To achieve this, close liaison and mutual cooperation with the food and allied industries have been established and are expanding.

Institute objectives, therefore, are:

1. Stimulation of commercial acceptance and development within the food industry of a volume capacity for radiated foods for the Armed Forces' procurement.

2. Provision of an essential technological advance for radiating foods for the consumer market.

Actively engaged in radiation studies before the Institute's extensive program got underway were American Can Co., Swift & Co., and National Canners Assn. They continued their studies yet, at the same time, wished to cooperate with the Army's effort to achieve its goals more expeditiously.

Fortunately, the Office of the Quartermaster General was able to draft contract agreements with these firms.

In this way, the Food & Container Institute provided the irradiation services and the industrial laboratories the technical know-how of their research staffs.

Recently added to this list of new contractors are Continental Can Co.; General Mills, Inc.; Pillsbury Mills, Inc.; and Quaker Oats Co.

Cost Data

Since cost of radiation from AEC is directly tied to the munitions and other programs, accurate expense estimates are not available. Moreover, comparison of the economics of electron generators vs. gamma ray sources is also difficult at this time. Reason is that a great variety of machines have been primarily built as research tools rather than production-line units.

However, the current gage is that costs will run from a fraction of a cent to 5 or 7¢ per lb. This range is based on many factors, including the amount of radiation needed to do a specific job and the type and configuration of the radiation source.

For further evaluation of the economics and logistics, the Army is about to award an extensive contract.

* Category 1: American Meat Inst. Foundation, Armour Research Foundation, Cornell U. (N. Y. St. Agr. Exp. Sta.), Florida State U., General Electric Co. (Union College), Hormel Inst., Iowa State College, Mass. Inst. of Tech., Ohio State U., Oregon State College, Penn. State U., Southern Research Inst., Stanford Research Inst., U. of Calif. (Berkeley), U. of Calif. (Davis), U. of Calif. (Los Angeles), and U. of Mass. 2: Lab. of Vitamin Tech., Mass. Inst. of Tech., Midwest Research Inst., and Oregon State College. 3: Applied Radiation Corp., Argonne Cancer Hosp., Argonne Nat. Lab. Brookhaven Nat. Lab. Electronized Chem. Corp., General Electric Co., High Voltage Eng. Corp., Phillips Petroleum Co. (AEC), Southwest Research Inst., Stanford Research Inst., and U. of Utah (Dugway Proving Ground). 4: American Meat Inst. Foundation, Nat. Canners Assn., U. of Chicago, and U. of Mich. 5: Columbia U. and U. of Wisconsin. 6: USDA (Beltsville) and U. of Mich.

How Different Foods Stand Up

Bruce H. Morgan

As we see it, the process of irradiating foods is not radically different from today's production-line methods, except in one small way—replacement of the thermal or freezing section of the line with an irradiation chamber and device. Food will still enter in a raw state for cleaning, grading, packing into a sealed package, irradiating (in this case), and warehousing.

As for time needed to give a sterilizing dose of irradiation, we are thinking in terms of several seconds for material such as a meat pattie using an accelerator, or X tons per hour with gamma radiation using conventional food packages. In addition, this treatment will involve heat changes within the product in the order of less than 5 deg.

Irradiation involves introduction of sufficient radiant energy into foods to destroy all microorganisms. Killing of these microorganisms is actually produced through an induced change in their chemical structure. And, since irradiation cannot be controlled to strike only the microorganism, some food chemicals will be hurt.

This change in the food's chemical constituents—core of our problem—has been estimated to be in the order of only 0.003% of all compounds present. We must recognize that even at this low concentration some foods appear to be satisfactory while others change in acceptability.

This brings up a point that many times is not considered in this field, although fully recognized by other segments of the food industry—*i.e.* the difference between a taste or odor sensation we associate with a given food product and whether the sensation itself is a desirable one. Thus, the literature has many references to changed tastes but does not always differentiate as to whether these tastes are desirable or obnoxious. The terms *off-flavor* or *off-odor* are, in themselves, not definitive enough to evaluate a new process.

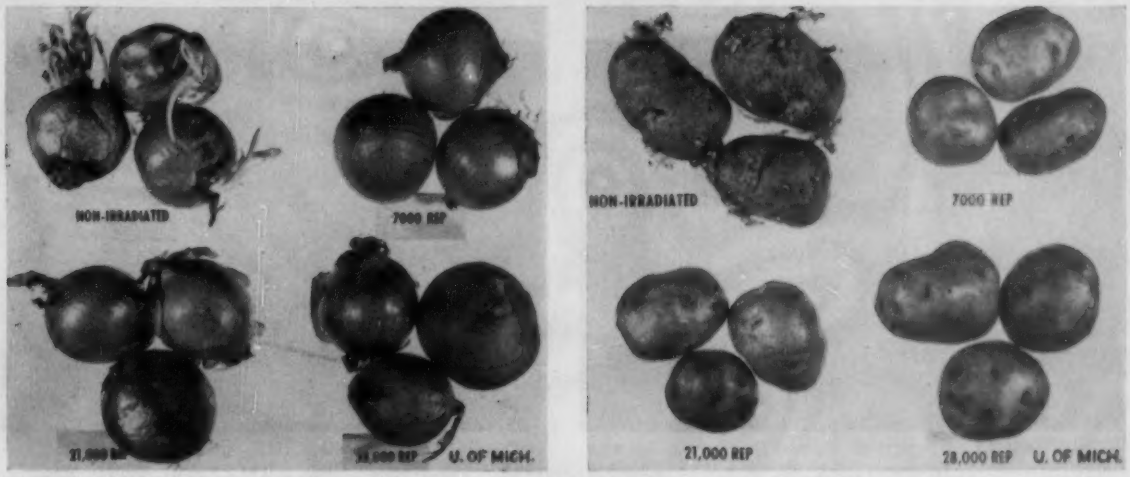
Reported are several methods of protecting, in specific irradiated foods, the tastes and odors we are familiar with. Examples include exclusion of oxygen, freezing, or use of chemical additives. To date, it does not appear that control of acidity is successful in this respect.

What, then, are the specific changes, or lack of changes, encountered in particular foods? To this end, we have grouped some foods reported in the literature under the headings fruits, vegetables, meats, and miscellaneous.

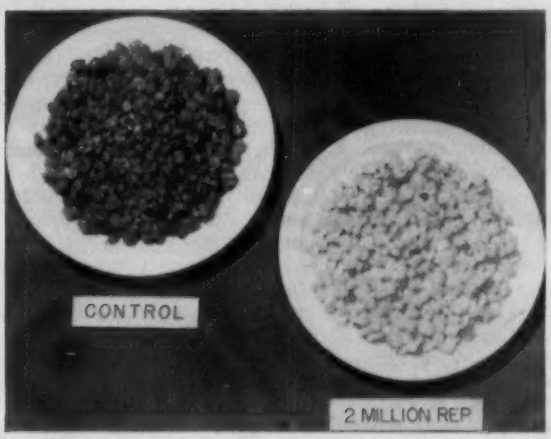
With a specific product, such an approach immediately shows contrasts between laboratories, or within laboratories. These differences are only evidences of the variables we have yet to determine and are no reflection on a particular laboratory.

Factors such as strain, age, method of handling, etc., have been shown in other areas of food preservation to be causes of such inconsistencies. In addition, all the possible unknown factors involving the radiation itself

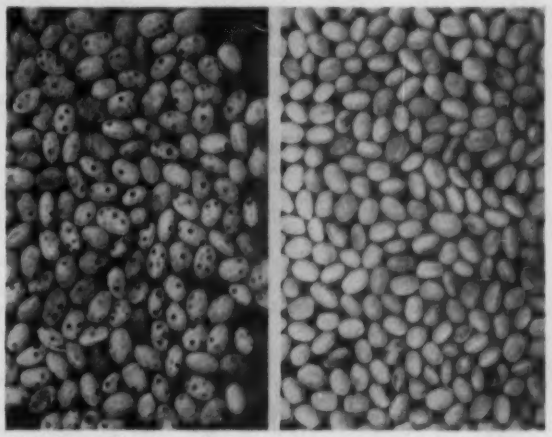
Checks Sprouting, Darkening, and Infestation



ONIONS AND SPUDS given low doses of 7,000 rep. from a gamma-cobalt source of radiation were kept from sprouting as long as 9 months after treatment. Doses were applied several months after harvesting.



3 MONTHS after subjection to 2,000,000-rep. from gamma source, corn (right) still had original quality. But corn not irradiated (left) darkened.



43 DAYS after inoculation with weevils, untreated beans (left) were badly infested. But irradiated beans (right) were insect free. Dose: 100,000-rep.

may be involved. It is these inconsistencies that place irradiation processing in the developmental category.

Fruits

Apple juice has been reported to have good color and odor after treatment with 500,000 rep.[3] O'Meara[8] used 1,000,000 rep. and found no flavor alteration, but he did note a marked bleaching action at 300,000 rep.

In comparing irradiated orange and apple juices, Hannan[8] noted an irradiation flavor in the apple juice at 1,000,000 rep., but to a much less extent.

It is interesting to note the effect of temperature during irradiation upon the enzyme (tyrosinase) involved in apple browning. As for inactivation,[6] dose for the enzyme irradiated at room temperature was 5 to 7×10^6 rep., while at −78 C. it rose to 10×10^6 rep. Such factors might well be involved in these differences.

Applesauce has also been irradiated with a satisfactory result at the 2,000,000-rep. level.[6]

Bananas. Irradiation of the whole fruit in general reduces the rate of internal softening but also accelerates skin blackening. The University of Michigan group[5] found that 150,000 rep. increased shelf-life of the fruit and skin darkening. After 30 days, this treatment gave a satisfactory and firm product. At 100,000 rep., it was softer, and at 50,000 not only soft but discolored. Meanwhile, the control had completely softened.

Hannan[8] essentially confirmed these results. He found 10,000 rep. sufficient to appreciably delay ripening of hard green bananas.

Cantaloupe withstood 1,000,000 rep. without negative results.[6]

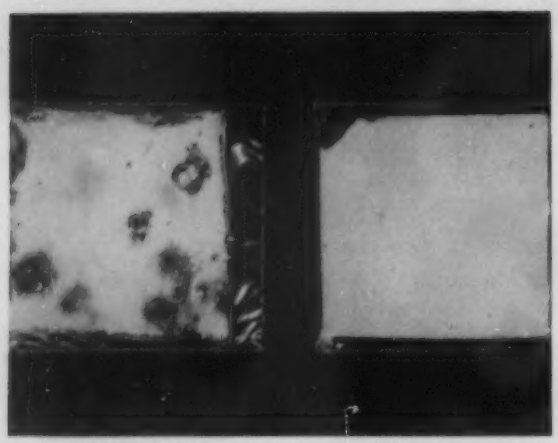
Cherries showed little change in acceptability at 1,000,000 rep., with a possible loss of flavor at 2×10^6 and 4×10^6 rep. and no loss of texture at these high doses.[6] However, in this higher range, the fruit browned on standing overnight. The University of Michigan confirmed this by finding an acceptable product after 1,000,000 rep., but with some softening.[6]

Black currants. Irradiation at 100,000 rep. resulted in a definite softening, while at 2,000,000 rep a bleaching was noted.[6] At 1,000,000 rep., a definite loss of the sharp typical flavor of black currants was noted. In this case, irradiation in frozen state partially protected the flavor.

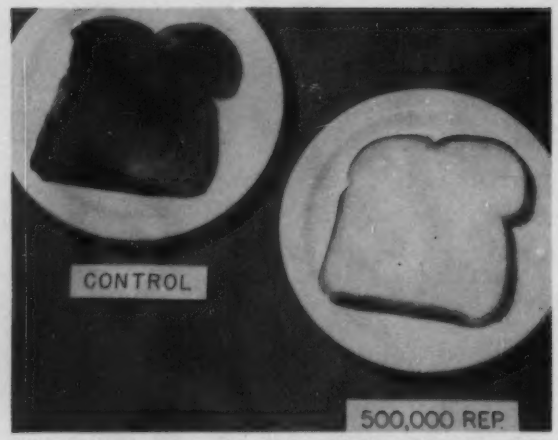
Red currants and raspberries softened at 100,000, but began bleaching at approximately 500,000, at which dose a loss in sour flavor was noted.[6]

Protective methods were employed on these high ascorbic acid-content

Cheese and Bread Comparisons



NON-IRRADIATED wrapped cheese (left) soon became moldy. However, sample (right), treated with 2,000,000 rep., was good after 3 months.



UNTREATED bread slice (left) quickly got moldy. But 500,000 rep.-treated slice (right) continued in original condition.

products. In general, irradiation, while frozen, markedly protected color, but degraded texture and left the flavor unacceptable at over 500,000 rep. Soaking berries before irradiation in 0.1% potassium metabisulphite, draining, and irradiating eliminated the unpleasant flavor component in the flavor change but did not protect the color, texture or natural flavor of the fruit.

Gooseberries softened at 100,000, lost typical flavor at 500,000, produced an irradiation flavor at 1,000,000, and bleached at 4,000,000. However, soaking the berries in 50% sucrose after blanching markedly aided flavor.[8]

Grapefruit showed no loss of acceptability[5] at 500,000 rep.

Lemons lost acceptability[7] below 500,000. But a lemon juice concentrate sustained not only 500,000 but 1,000,000 rep. and still was acceptable.[8] Single-strength juice was acceptable at 100,000 rep.

Oranges (whole Sunkist navel) irradiated prior to squeezing the juice and storing overnight at 40 F resulted in less bitter juice in the 30,000-rep. treatment than in the control.[8] Using 60,000 and 100,000 rep., the juice was more bitter than the control and had a typical irradiation odor, described as unpleasantly cabbage-like.

Duplicating the above experiment but extracting the juice prior to irradiation revealed no preference between the control and irradiated samples. Both were equally acid and bitter. Proctor found that loss of acceptability of the whole fruit and juice occurred between 100,000 and 500,000 rep. O'Meara[8] noted off-flavor at 150,000, but irradiation in the frozen state obviated off-odors and flavors.

Whole peaches were satisfactory when irradiated below 1,000,000 rep. Halves or slices in syrup were still acceptable at the 2,000,000 level.[1, 6, 10]

Plums were acceptable[6] at a dose less than 400,000 rep.

Prunes. Definite bleaching of the flesh and no color change of skin were noted[11] with dose up to 10,000,000. However, storage at 70-80 F. for 2 weeks allowed the flesh to return to normal color (no flavor change).

Raisins (Thompson's seedless) irradiated up to 10,000,000 rep., showed bleaching of flesh and skin and then a normal color after 2 weeks' storage at 70-80 F. Here, an off-taste was noted at the higher doses.[11]

Strawberries. Hannan reported softening and bleaching of the whole berry at 500,000 with slight irradiation flavor.[6] Proctor,[8] using a 45:55 jelly noticed a "detectable change" in flavor at 50,000 and extensive bleaching but no textural alteration. In irradiating the corresponding jam, a significant flavor and color change was noted at 100,000 but not at 50,000. In this product a moderate change in consistency was detected.

Rhubarb treated with a 2,000,000-rep. dose revealed a limp stem and a pronounced loss of sharp acid flavor.

Vegetables

Green asparagus treated with doses of 200,000, 500,000 and 1,000,000 rep. slightly lost preference on the first day of irradiation to the non-irradiated. There was a loss of the charcteristic bouquet, softening, and bleaching at 1,000,000 rep. At lower doses, flavor was termed flat.[10]

However, Proctor[10] and Hannan[6] produced acceptable asparagus at 2,000,000 rep. with only slight loss of texture, bleaching, and flavor. With this asparagus, softening and bleaching can be acceptable.

Green beans. Acceptable irradiation doses for pureed green beans ranged from 250,000 to 1,000,000 rep. For the whole bean, the level was 1,000,000 rep., which was raised to 1,500,000 by soaking in 1% sodium ascorbate and to 2,000,000 using a blanching process.[14]

Lima beans appear to represent the more sensitive side of the bean family but give an acceptable product at the 50,000-rep. level.[15]

Baked beans in a tomato sauce were acceptable after exposure to 2,000,000 rep., with no unusual flavor and odor.[8]

De-infestation of adult weevils in dry navy beans was attained by doses of 10,000 rep. This gave an acceptable edible product, but growth of planted beans was retarded.[16]

Broccoli withstood doses up to and including 2,000,000 rep.

Carrots (commercial thermally-treated pureed) exhibited no change in the flavor[15] between 500,000 and 1,500,000 rep. There was a slight browning but no texture change.

Raw carrots treated with a 2,500,000-rep. dose showed no change in color or taste but a softening was evidenced. Blanched carrots did not soften. Hannan noted little if any irradiation odor or flavor change with a 2,000,000-rep. dose. Flavor change was less than in the natural carrot, especially in astringency.[6]

Cauliflower withstood slightly less than a 2,000,000 dose without loss of acceptance.

Celery was unacceptable upon treatment with 250,000 rep. Flavor and especially texture were affected. Storage at 36-40 F. for 1 week allowed some return in flavor.[7]

Cabbage was acceptable[26] at 250,000 rep. At 1,000,000, no odor or flavor changes were noted, but the loss of texture was severe.

Cole slaw, stored at refrigeration temperature in perforated polyethylene or cellophane bags, showed prolongation of storage life to 25 days as against 6-7 days for the control.[12] No changes in color, texture, or flavor were noted between 50,000 and 150,000 rep.

Corn. Less than 500,000 rep. gave corn an acceptable but slightly sweeter product.[7]

Endive showed no flavor change with a treatment of 50,000 rep. However, when irradiation was followed by refrigeration, non-irradiated endive was less desirable after 12 days. After 19 days, the control spoiled and the irradiated was still acceptable.[12]

Lettuce revealed no marked irradiation odor or flavor, but at a 1,000,000-rep. dose it lost crispness and natural flavor.

Pureed peas withstood doses[10] from 250,000 to 500,000 rep.

Green peas were reported to withstand 800,000 rep. and they also showed a better product when previously blanched.[17] Irradiation had a softening effect equivalent to a boil of about 4 min.

Proctor also noted a satisfactory product[14] under 1,000,000 rep. However, he raised the dose to 1,500,000 using a blanch with sodium ascorbate to keep peas acceptable for 45 days at 38 F. Hannan noted a loss of texture at about 500,000 rep., a flavor change above 1,000,000, with bleaching above 2,000,000.

Potatoes treated with a 25,000-rep. dose (range of sprout inhibition) showed inactivation of the enzyme catalase (1 mg./1 ml.) But when mashed potatoes were analyzed for catalase, a dose of 5,000,000 rep. was needed for inactivation.[4]

Boiled irradiated potatoes kept 3 yr. without browning at O C. in polyethylene bags in presence of oxygen.[9] However, at doses in the range of 2,000,000 rep., oxidative changes affected taste upon storage.

Potatoes given doses between 5,000 and 20,000 rep., kept 18 months, exhibiting firmness and some sweetness.[28] During this time, controls lost 55% of their weight and were inedible, while irradiated spuds lost only 20%. Storage of unirradiated potatoes at 50 F. resulted in souring.

Sweet potatoes, pureed or whole, appear to withstand doses[30] in the order of 2,500,000 rep.

Onions (3 to 4-in. white and yellow strains of sweet Spanish) did not sprout when treated with a 2,000-rep. dose and held 5 months at 55F. and 70-80% humidity.[29] It took 8,000 rep. to do the same job with 1.5 to 2.0-in onions. At 65 F. and 30-40% R.H., a dose of 4,000 rep. inhibited all sprouting, regardless of size, for a 5-month period.

Brownell noted no difference after 2½ months between irradiated and non-irradiated Spanish onions given doses[19] of 7,000, 21,000 and 28,000 rep. However, he did note a loss of some sharpness and a slight sweetening. Although served seasoned and with butter, the onions needed to be cooked as long as the control and appeared to lose texture.

Spinach has had various reports, ranging from doses of 500,000 to 2,500,000 rep. to give an acceptable product. It appears fair to assume that an acceptable product can be produced[24] using in the order of 2,000,000 rep.

Squash revealed no color or texture change at 500,000 rep. But the level of irradiation allowable for acceptance has been reported[25] between 150,000 and 210,000 rep.

Tomatoes (whole under-ripe) exposed to 100,000 rep. and stored 14 days at 20 C. was acceptable product, while 40% of the control spoiled. However, the irradiated product had slightly less of the characteristic taste than a normal fruit.

Hannan exposed whole tomatoes and found less flavor loss in them than in sliced tomatoes.[8] He noted some bleaching and loss of texture in whole fruit at 2,000,000 rep., with flavor diminished but acceptable.

With sliced tomatoes, he detected no change in appearance and texture up to 4,000,000 rep. But a flavor that was evidenced at 1,000,000 rep. was reminiscent of heat-process tomatoes.

Tomato juice concentrated 1 to 4, showed no change in flavor at 100,000. Flavor was altered at 250,000 rep. Only slight bleaching and no textural loss were detected.[15]

Meats and Fowl

Interest in applying irradiation to meet and meat products has not only been intense but extensively reported.[22] Beef appears more sensitive than veal, and pork the least.[20] Liver, kidney, spleen, thymus, and brain show little if any organoleptic change.

Irradiated odors in meat appear, at least in beef, to arise from sulfur-containing compounds such as glutothione.[20] These odors have been described as burnt or scorched at 2,000,000 rep. and over-heated meat cereal odor at 4,000,000 and a sweet odor at 8,000,000 rep.

In general, color in iradiated meat stays red, but it is usually slightly redder than normal.

Beef (raw ground) was acceptable after 10 days' storage at 38 F. when exposed between 50,000 and 100,000-rep. doses.[12] Given a 110,000-rep. dose, it retained more red color than when exposed to 50,000 or 80,000 rep. Schweigert reported treatment in the range of 50,000 rep. extended refrigerated shelf-life by a factor of 4x5, without producing any detectable off-flavor, odor, or color.[23]

Beef exposed to 1,000,000 rep. evidenced off odors, but no difference was noted in taste if 1% sodium ascorbate (water solution) was incorporated.[20]

In other work, beefsteak exposed to 2,000,000 rep. was considered acceptable. Blanched beef liver withstood 2,000,000 rep. Sodium nitrite (100 ppm.) is reported to protect the flavor of raw minced beef.

Bacon and corned beef irradiated at 1,500,000 rep. were free of off-flavors after cooking.[27] Canned sliced bacon exposed to 2,500,000 rep. has also been reported to be absent of any significant flavor change.[31]

Chicken apparently withstands irradiation dosages in the order of 2,000,000 rep. without loss of acceptability.

Frankfurters withstand 1,000,000 rep.

Ham (2,000,000 rep.) was firm and lighter in color than the thermally processed.[20] Irradiated ham had less noticable off-flavor than beef or pork luncheon meat. There appeared to be no change in flavor upon storage.

Lamb chops were acceptable at levels less than 50,000 rep.

Pork exposed to doses of 60,000 to 80,000 rep. extended refrigerated storage-life 10 or 11 days.[12] Pork sausage withstood between 2,500,000 and 3,000,000 rep., while ground unspiced pork gave an acceptable product[16] at 2,000,000 rep.

A dose of about 30,000 rep. prevented maturation of larvae of trichinae in pork.[20]

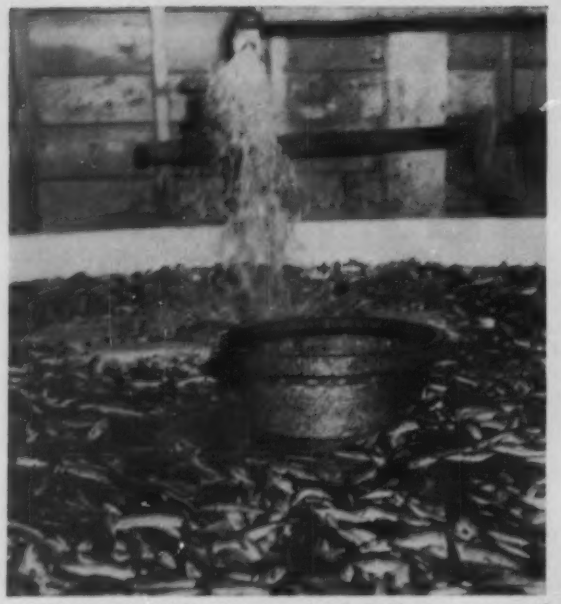
Miscellaneous

Coffee exposed to doses up to 1,000,000 rep. revealed a noticeable effect on flavor.[12] Irradiation of the roasted ground coffee, however, had a slight effect on taste. Irradiation between 10,000 and 1,000,000 rep. of roasted coffee resulted in a loss of fresh coffee aroma.

Spices, in general, lose some small percentage of their characteristic taste or odor, which can be compensated by formulation.

Milk is very sensitive to irradiation damage, resulting in oxidized chalky or burnt flavor. Even at 100,000 rep. given at 50-60 F., an undesirable flavor was noted.[8] This adverse flavor slightly

(Turn to page 154)



RAW MATERIALS: State-inspected sardines are pumped from hold of fishing vessel to storage tanks, where they are held in saturated brine until processed.

CANNED SARDINES: Packed 5-7 per can, fish are ready for cooking and baking in continuous unit. After oiling, sealing, and washing, cans go to retorts.

Open-Can Cooking and Baking Achieves Top-Quality Product

Appearance and flavor of fish are markedly improved by instrument-controlled processing in continuous cooker and oven. Unit handles 256 cans per min. . . Construction and operation detailed

OSCAR HARTMAN

Manager and Treasurer, Green Island Packing Co., Rockland, Me.

Ever watchful for ways to improve our sardines, we at Green Island Packing Co., Rockland, Me., saw a promising opportunity and took quick advantage of it.

Specifically, our attention was centered on the batch-cooking operation, in which prepared fish were placed on trays and processed in steam chambers.

However, sardines were not being cooked as uniformly as desired, and their skins often were cracked by the steam. Then after cooking, fish had a tendency to stick to the tray, which made transfer of whole product to tins difficult.

Another disadvantage of this setup was lack of facilities for baking the cooked sardine. We considered baking an essential quality factor because it gives the fish a toasted flavor and golden color. And by removing excess moisture, it prevents clouding of the oil in which the sardines are packed.

Clearly, quality could be improved by controlled cooking and baking.

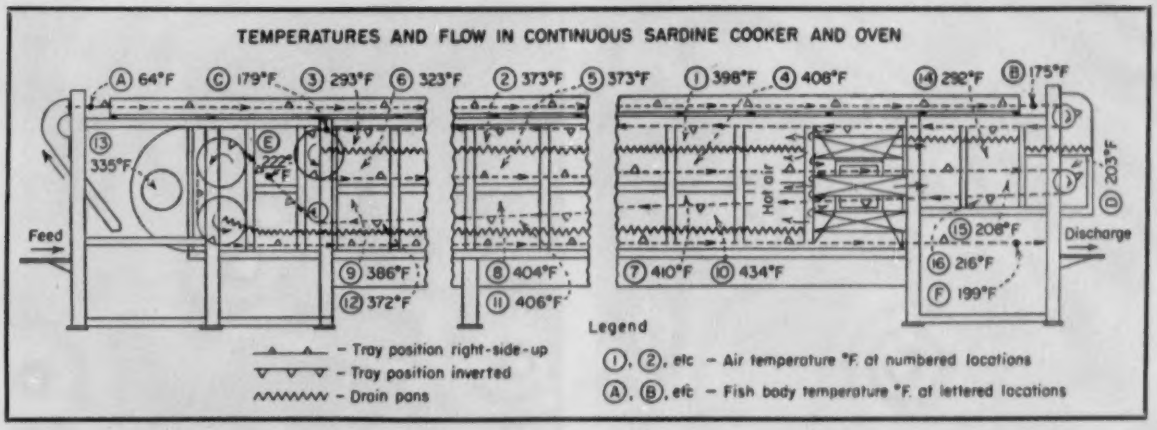
Providing the opportunity we sought was a continuous sardine cooker and oven (Food Machinery & Chemical Corp., Hoopeston, Ill.), which was smoothly integrated into the processing line.

Now, fish are cooked in open tins as they travel through a steam zone. And moisture is effectively reduced as cans make four passes through hot-air chambers.

Cooking is uniform, since all process variables are automatically controlled. There are no broken skins because fish are cooked in the final container. And reduced handling results in a more sanitary procedure. Moreover, baking improves color and flavor, permits better penetration of oil into the sardine, and keeps the oil clear. Finally, sealing of cans while they are hot provides greater vacuum for increased shelf life.

Construction and operation of this cooker will be detailed after a brief description of Green Island's sardine line.

Fish are pumped from weirs (where they are held for 24 hr. to eliminate stomach residues) to ship's hold and salted immediately. On arrival at the cannery, they are sampled by state inspectors. Then, the hold is filled with water for pumping sardines to tanks where they are kept in saturated brine.



From holding tanks, fish are supplied to packing stations by flume and flight elevator. Operators remove inedible portions, fill 5 to 7 sardines into a can, and place groups of 32 cans on trays. After inspection, trays are hand-trucked to the continuous cooker and oven.

After cooking and baking, fish are oiled and sealed in combination units (American Can Co., #12 Universal) at 125 cans per min. Next comes washing to remove exterior oil, processing in retorts, further washing, and cooling to room temperature in bins.

From here, cans are packed into cases, which are sent to a case sealer, then go to storage.

Cooker Details

As shown on our schematic, the unit consists of a number of hot-air chambers bolted together between feed and discharge ends. This assembly houses the three longitudinal sections of the oven. Above is the steam zone in which heating is carried out by four steam coils fed by a ¾-in. supply pipe. Live steam, throttled to the atmosphere, discharges at two vapor exhausts—one at each end of the cooker—and four condensate drains.

YOU'LL FIND a graphic flowsheet of Green Island's advanced processing on p. 102-105.

Auxiliary equipment includes an endless chain conveyor, oil heating system, fans, ductwork, piping, and controls. The conveyor is driven by a 3-hp. variable-speed drive. It makes five passes through the unit at a speed of eight trays per min., and has a holding capacity of 8,000 cans. Overall, the cooker is 60 ft. long x 10 ft. high x 5½ ft. wide.

Air and product temperatures at various levels in the cooker are noted on the diagram. Steam requirement for the cooking zone is 600-650 lb. per hr. Air supply to the oven is about 10,300 cfm. at 505 F., which consists of 6,770 cfm. (625 F.) from the heating system plus 3,550 cfm. (335 F.) recirculated. Total heat load is 2,700,000 Btu. (calculated above 70 F.), requiring 20-21 gal. per hr. of #2 fuel oil.

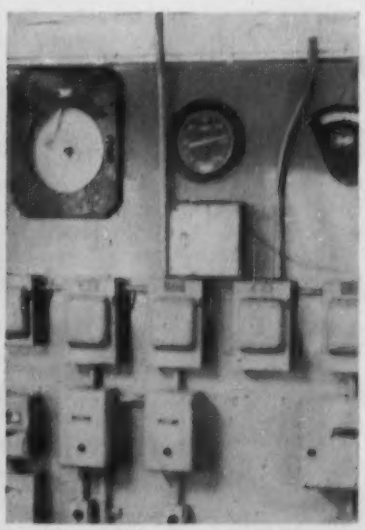
Outstanding in the cooker's design is the provision made for inverting the open cans during two of their four passes through the oven. Purpose of this arrangement is to permit drainage of free moisture, which is essential for maximum efficiency by this drying method.

But how hold the fish in the open

(*Turn to page 99*)

Non-Stop Sardine Cooker and Its Control Panel

AT FEED END of 60-ft. continuous cooker and oven (seen in background), filled cans on trays are locked on cooker's chain conveyor. This holds fish in cans when inverted for drainage in passing through unit. Note mesh conveyor (left) that returns grids to feed end.



TEMPERATURES in steam zone and hot-air oven are regulated by recording controllers. Switches below operate cooker chain and fans.

"PEELING A STEAK." Housewife demonstrates ease with which wax can be stripped from meat cuts.

1 SAW OPERATORS replace butchers on mechanized line. Result is faster, cheaper meat cutting.

Packaging Costs Cut, Quality Protected by

Wax-Coating Frozen Meats

One processor saves 20%. Further, he foresees 10-fold jump in output before year-end, using just one machine and three workers on 8-hr. shift

EDWARD P. McGRATH
"Food Engineering" Editorial Staff

"Dinner in a few minutes—soon as *I peel the steaks.*"

This clean, handy way for Mrs. Consumer to ready her meat is now becoming familiar in Midwest kitchens, following introduction of the novel meat-packaging process developed by M. E. Wallis Plastic Wax Co., Milwaukee.

The method seals fresh frozen meat in a coating of wax to guard color and flavor and avoid moisture loss.

Offered initially by supermarkets in Chicago, St. Louis, and central Ohio, the wax-protected meats are "catching on fast."

Thus coated, the cuts keep a full ten days under normal refrigeration, and indefinitely in a freezer, without discoloration or loss of juiciness through weight shrinkage. Accordingly, the housewife may buy a supply of meat for a week or more on one visit to the market.

Packaging Economy

To the processor, the waxed product means faster, more economical packaging. The method is specifically cited in Ohio as permitting a lower price than that charged for conventionally wrapped cuts. Beef, for example, has been priced about 20% less.

The coating eliminates down-grading of fresh meats caused by discoloration. And it reduces packaging labor, since the meat is dipped automatically. It's noted that one processor, weighs, waxes, and packs 6,000 lb. of meat per 8-hr. shift using only three unskilled girls.

Among the first to use the wax coating are Tom Boy Stores, St. Louis; Silver Platter, Chicago; and McAllister Dairy Farms, Warren, Ohio.

"We are 100% satisfied with acceptance of the waxed meats," reports Temple AcAllister. His Ohio firm began waxing meat in February and since then has had to rapidly revamp its meat department to handle skyrocketing sales.

Future plans call not only for increased production but also addition of fish and poultry to the coated line.

A peak production of 60,000 lb. daily with one waxing machine has been forecast by McAllister. A peak meat sales figure of $10 million is also forseen for this year. This company initially packed 6,000 lb. per shift of frozen beef, veal, lamb, hamburger patties, and luncheon meats. Its packaging line employs only one weigher and two girls to pack the meats into shipping cartons.

2 **PREPARED CUTS** are wheeled from cutting room to weighing station and waxing machine.

3 **VALUEPRINTER** marks weight, product name, and price on label when weigher punches keys.

During a recent three-week period, McAllister had orders for more meat than it could produce, even after augmenting the meat department staff. Without advertising, it has sold more waxed than fresh meats—and customers keep asking for more.

The company's new $300,000 plant has been specially designed for an efficient one-floor, straight-through, meat-packaging operation.

Waxing Action

Here, frozen meat is cut on a mechanized line that uses saw operators instead of butchers—an added economy. Mass-production methods are used, these operators turning out hundreds of cuts of one type before changeover to another cut.

Wheeled racks carry the meat to the waxing machine. A woman operator weighs the cuts on a Toledo Scale Co. Valueprinter. This unit prints weight, price, date, product name, and also the value when the weigher punches keys on the board at the right of the scale. Weighing the meat before waxing insures the consumer that she is not "paying for the wax."

The printed label goes on top of the meat, then the cut is placed on a wire-belt conveyor for transfer into the J. W. Greer Co. continuous waxer.

In the machine, the cuts travel through a melted wax dipping tank, which is temperature controlled. Emerging from the tank, a curtain flowpan covers them with an even coat of hot wax. Bottoming device provides under-coverage.

The product is then automatically transferred to a dampened neoprene belt that acts as a cooling conveyor. Low temperature of the meats and the circulation of air around the cut quickly hardens the coating.

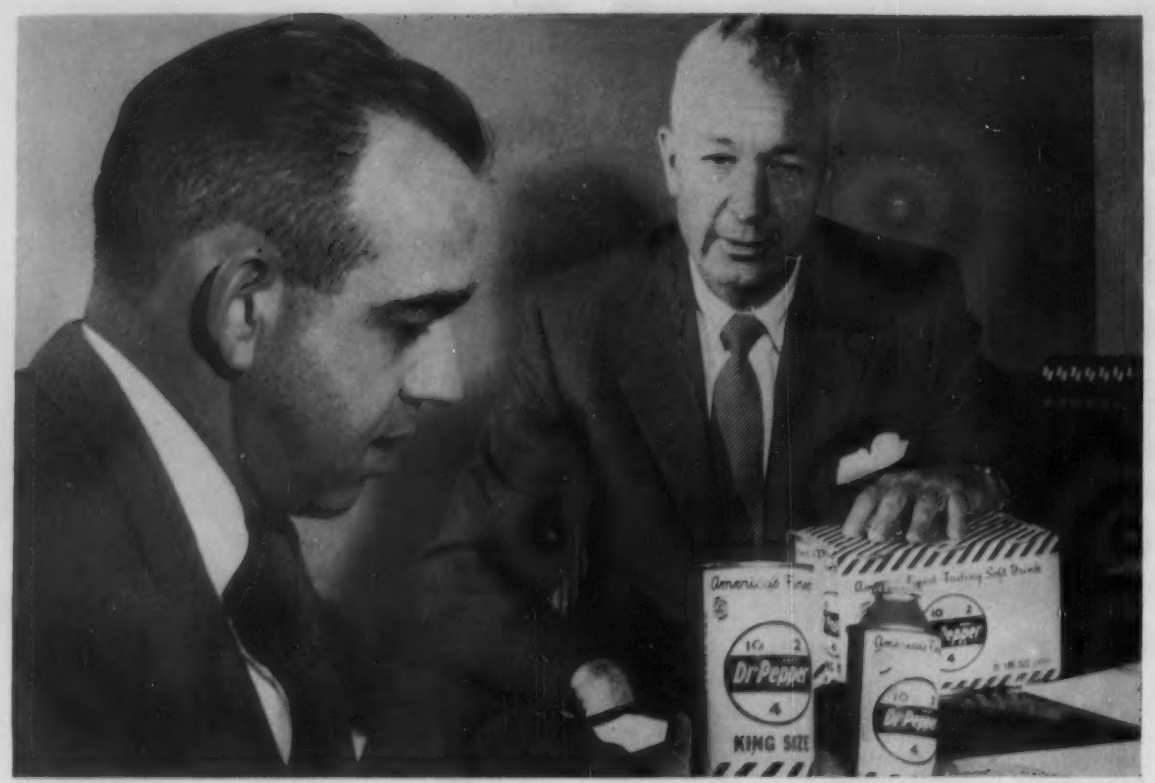
Made of stainless and chrome-plated steel, the coating machine takes up 3 ft. 8 in. by 17 ft. of floor space. It is readily serviced through hinged top and side panels.

The built-in melter takes up to 80 lb. of solid wax. Melted, it drains into an oil-jacketed, temperature-controlled storage tank at the base of the coater, and from here it continuously circulates via sanitary pump, through

(Turn to page 77)

4 **CONVEYOR** carries labeled cuts into waxing machine. Note control panel (arrow) for regulating temperatures.

5 **COOLING BELT** carries waxed meats to women who place them in cartons for shipping.



DR PEPPER executives W. W. Clements, vice-president and general sales manager (left), and Leonard Green, president, inspect 6- and 12-oz. cans used in St. Louis market tests. Also tried was 12-oz. cone top can.

Closeup Look at

Dr Pepper's Can Venture

Initiated last October in St. Louis, beverage in cans is now "going strong" in five areas, with more to come. Success is credited to multi-media promotion, company teams, handy carry-home carton. Extensive research preceded big step

JEANETTE PASCHALL
Special Correspondent, Dallas

Introduction of a new-type package always requires careful consideration and planning.

And when this new package entails an increase in the selling price to the consumer, the step further requires a good deal of fortitude.

Such was the situation facing Dr Pepper Co., 70-yr-old Dallas, Tex., soft drink concern, when it decided to offer its product in cans.

The company had been considering this move for a number of years. In the '40s, however, the can companies simply did not have a liner that would fill the bill.

In the early '50s, when certain brands hit the Eastern market with such high-acid drinks as cola, club soda, and ginger ale in 6 and 12-oz. cans, company executives asked themselves: "Is the time ripe for us to put Dr Pepper in cans?"

The price picture, which from 1946-'49 had progressively reduced bottlers' profits, had altered in the last six years. Eastern and Western markets broke first, but the "Solid South" had remained fairly firm at a nickel. And it was here that Dr Pepper held its major strength.

No. 1 decision of President Leonard Green and his sales executives was that "the product in the can must be *right* before going into any can program."

Accordingly the task of solving the can problem was turned over to company laboratories in Dallas, and in 24 months two liners were found that appeared to be satisfactory for Dr Pepper.

During this period, Dr. H. Buttler and his staff tested many liners and experimented with different can sizes.

Part of the research was directed toward determining which type can should be sales tested.

Market Research Begins

Now company executives began to scratch heads in an effort to determine the packaging direction of the soft drink field. They knew there was a definite need for a throw-away package. But would it be a can or a bottle?

President Green had this to say: "Throw-away containers of some type are coming, and they offer tremendous sales possibilities. But the only way we can find out which will best serve our purpose is to test them in the market. The public is our 'supreme court.'"

Since both can and throw-away bottle cost more than returnable bottles, the customer would have to pay the premium for the package. Would he be willing, considering his resistance to any increase from the nickel price? Why not ask him?

The can field was so new and uncultivated that company executives felt any consumer research would have to be done with the package itself—on the shelves of grocery stores. They did not think a door-to-door canvass would solve any of the problems, hence they went directly to the market.

For the first test, President Green and his staff decided on St. Louis, where a company-owned plant was operated. Also, they moved to set up a separate advertising appropriation for the promotion.

Cartons and Canning

Unanimous decision was to promote the program with take-home cartons appealing to the consumer. Arrangements were therefore made with the Old Dominion Box Co. to make 6-can cartons for each of the three sizes to be tested—6- and 12-oz. cone top, and 12-oz. flat top cans.

Rather than invest in special canning equipment, arrangements were made with a canner in Madison, Wis., to fill the cone top cans, and with another in Springfield, Ill., to handle the flat top ones. Selection was based on proximity to St. Louis and ability to take care of the company's planned capacity.

The company would have liked to hit the 1954 summer market. But this was impossible, since advertising and production schedules were not ready. However, on Oct. 13 came announcement that the test would begin in a week.

To introduce to the public the idea of the market test, the company used heavy newspaper advertising, followed by billboards, TV, and radio. As an extra incentive, a one-time 25¢ redeemable coupon ad was used.

Another policy decision concerned distribution: In St. Louis all merchandise was distributed through regular bottling plant routes.

In this test the company was aiming at the home market, representing 25-30% of its total volume. It meant grocery store distribution exclusively. The outlets were divided into large supermarkets, supermarkets, associated grocers, and independents.

In each group it was decided to vary the new packages and their accompanying displays. However, the standard 6½-oz. bottle was common to all stores. It was to be the yardstick for measuring the test packages. The company wanted to determine the effect of one-way packages on regular bottle sales.

Every conceivable combination of packages was evaluated. In some stores, even the carton was changed to determine the psychological appeal of foil *vs.* plain white stock.

Next test gaged effect of cans in the home-plant territory. On Nov. 11, 1954, the Dallas and Ft. Worth markets were opened to Dr Pepper in cans. Used here were 6-oz. cone top and 12-oz. flat top cans. The 12-oz. cone top cans were eliminated.

A food canner at Denton, Tex., was given a contract for the 12-oz. flat top can production and the 6-oz. cans were shipped from Madison.

With the higher per capita sales of the drink in Dallas and Ft. Worth, it was not felt that the 25¢ coupon was necessary. The company did, however, stick to the same basic ads as run in St. Louis.

Full page ads stressed the following advantages of the can: (1) No deposit, (2) no return, (3) no breakage, (4) chills faster, (5) stays cold longer, (6) easy to carry, and (7) simple to store.

After Dallas came Atlanta, home of Coca-Cola. Here came a test of acceptability of one container—the 12-oz. flat top can.

The company's advertising council reached the conclusion that in this

Cans Boost Bottle Sales And Up Overall Volume 14%

Testing cans in four initial areas—St. Louis, Dallas, Ft. Worth, and Atlanta—Dr Pepper officials found their new package promotion raised overall sales of the company's beverage a full 14% in the territories in question.

In short, the cans not only "took a hold of their own" but also accelerated sales of the bottled drink.

For a soft drink company that is relatively conservative, Dr Pepper has certainly taken long strides in a short time with its can-package program. Though testing in the year's lowest selling period, officials feel they are "out of the rough." And the results appear to back them up.

The 14% sales climb supports President Green's prediction of last October that the new package "would increase overall soft drink consumption." At that time, he stated that one-way containers would push national consumption of soft drinks far above the present levels of 28-30 billion bottles annually.

There have been no indications here that the can was replacing the bottle. Rather, it is a "Plus-Volume" package that appeals to a certain percentage of the home market. Meanwhile, promoting cans in cartons also increases sales of bottles in cartons. And as far as Dr Pepper is concerned, any rise in consumption is good for business.

Working from the test results, the company has now eliminated the two 12 oz. cans it had on trial. It found that the cone top 12 oz. didn't offer any particular advantage as far as the consumer was concerned. It didn't stack well, cost more, and most people poured it as two servings.

The 12 oz. flat top was a better seller. But 12 oz. was "still a lot of Dr Pepper." As ingredient cost was relatively high, it was decided to change to a 10 oz. flat top and emphasize the words, "King Size" in the promotion.

Points Highlighted by Test

Did the market trial come up to expectations?

Company executives answer with a decided "Yes." The testing clearly indicates that:

1. **Many consumers prefer a one-way container and are willing to pay the extra cost.**
2. **Sales in cans don't reduce sales of the 6 oz. bottles but actually up them.**
3. **Cans have produced new Dr Pepper drinkers.**
4. **Sales in cans are "Plus" business.**

In fact, Dr. Pepper is so sold on this "Plus Package" that, coinciding with the new Los Angeles promotion, it has installed a canning line at its home-owned bottling plant in Dallas.

Purpose is to ascertain whether it is more profitable to run its own line than to contract for canning.

highly competitive market some incentive must be used. Dropping the St. Louis premium, Dr Pepper ran its first newspaper spread announcing a 10¢ coupon on each carton. The same ad copy, along with radio and TV, was used here as in St. Louis, Dallas, and Ft. Worth.

Expanding the Markets

Then another idea: If the market tests were successful in any degree, cans would allow the company to step up its drive for national distribution.

Even before results were in from the initial market areas, President Green was planning the next step. His thoughts were to distribute the canned product where the company *did not* have franchised bottlers. In this way, he reasoned, the can would introduce the product and help pave the way for a future bottling operation.

From this reasoning came another question: Which unfranchised city would be best to test the effects of the can alone, without the bottle? After months of market study, Los Angeles was chosen.

The kickoff was the middle of this June. Every available means of advertising has been poured in. Seven TV stations, seven top radio stations, five newspapers, billboards, and direct mail are all in use as promotion media.

Here, Dr Pepper executives directed the selling to the chain stores. A sales and merchandising force of nine company-employed men was assigned to the area several weeks before the actual arrival of the cans. The man picked to head this crew was the former St. Louis bottling plant manager, who had market-test experience from that area's can promotion.

No coupons were offered in the initial push. Contracts were given to California canners to supply the 6 oz. cone top can and the newly designed 10 oz. flat top can.

As for the new canning line at the Dallas bottling plant, it consists of a Cem saturator, York cooler, 50-spout Liquid Carbonic filler, Crown rinser, and Standard Knapp packer. Three Dacam carton packers take care of packing and assembly. Designed to fill 6 oz. cone top cans exclusively, it has a capacity of 275 cases (48 cans each) per hour.

After canning, the problem of freight is of next importance. On public carriers, an approximate 100-mile radius is the break-even point to assure the can program gives sufficient profit to make it economically sound. However, since Dallas is also a bottler-syrup supply point, company owned trucks can haul cases of cans along with barrels of syrup and, in this way, equalize the freight costs.

New Can Designs

The company's ad agency (Grant Advertising) and its own promotion and statistical departments have studied the package and price picture along with sales results.

Following the narrowing of the cans to two sizes—10-oz. flat top and the 6-oz. cone top—it was decided to re-design the packages. The new design, introduced in June, is actually the equivalent of a four color effect, as the brass of the can is combined with white, soft green, and red. Company trademark is set in an oversized crown design on two faces of the can. Current slogan used: "The Friendly Pepper-Upper."

CHIEF CHEMIST Howland Buttler and Assistant Pat Kempe examine can for pitting. Tests, started five years ago, ferreted out suitable linings.

One point that was emphasized by officials at the opening of the program was that bottlers need not fear the can's effect. Whole purpose of the program was to determine how best to utilize the new packages to strengthen bottling operations. For that reason, each test market saw use of regular route trucks.

At an April bottlers' meeting, the can program was offered to 200 southwest franchised bottlers. The anticipated 6-oz. canning line in Dallas and the nearby 10-oz. canning line in Denton afford the Dallas area a central shipping point to these bottlers.

The company will handle all canning and sell the product by the case —8 cartons—to its bottlers. A five state area of Texas, Arkansas, Oklahoma, and portions of New Mexico and Louisiana will be serviced on an optional basis. If the bottler elects to go along with the program, then the company will spend promotional money in his market. He can supplement this advertising if he likes but is not directed to do so.

The Objective View

Before entering a program, it is easy to be objective and reasonable about its advantages and disadvantages. At the end of six months, however, you can, with the same ease, slip into a subjective attitude.

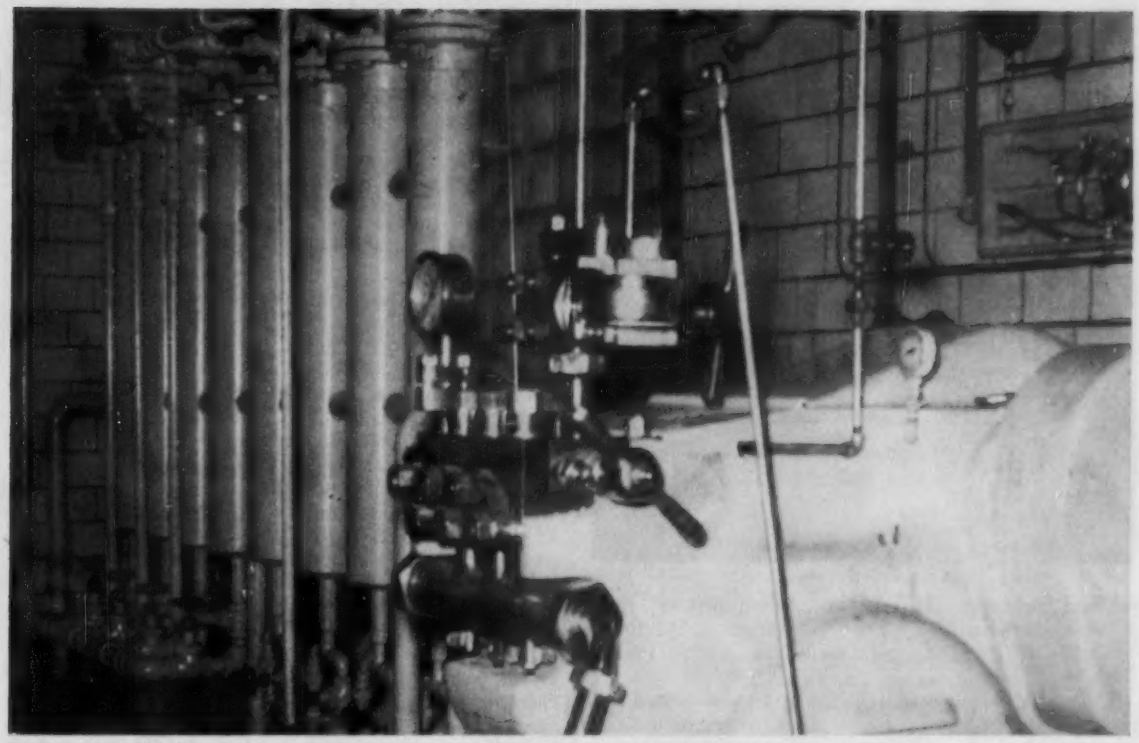
Throughout the testing, company executives have tried to take the third party's point of view. In summarizing the can as a package, they recognize that it is a convenience item. Some first sales are due to the package's newness, which focuses attention on the product. But re-use depends upon convenience.

They recognize, also, that a more dramatic design sales message can be put on the can than on a bottle. Few soft drink bottles display a three-color label including a sales message. The can is also lighter than a bottle, and the flat top stacks easily in a refrigerator.

Because of its ability to cool the product faster and keep it colder longer, the can actually does more justice to the drink, which has a recommended drinking temperature of between 28 and 33 deg.

Company executives also feel that the can protects the product from light and that this advantage insures the six months' shelf life guaranteed for the canned beverage. Percentage of profit for the bottler is essentially the same as on the bottled drink and, with the company's overall program of canning for him, the bottler does not have any production or canning equipment overhead.

(Turn to page 77)



KEY PROCESS UNIT: High-pressure pump (right) delivers soft water through 8-section heat-exchanger (left) and nozzle of aseptic canning machine to sterilize system. Then temperatures are adjusted to conditions of operation, and the product is pumped through heat-exchanger and sterile lines to the filler.

Sequence Control Operates New Aseptic Canning Line

Controls coordinated to initiate each step in complex operational pattern at right time. Result is uniform product, produced at top capacity with minimum of waste and human error

WM. A. DEAN JR., H. D. McAULIFFE, B. D. KRIBBEN, I. F. PLAGGE, and R. F. ROSE

Respectively, Chief Engineer and Director of Research, Bowman Dairy Co.; Technical Director and Director of Research, Bowey's, Inc., Chicago; and Project Engineer, W. F. & John Barnes Co., Rockford, Ill.

Tomorrow's food-process control is here today.

With it, management just relaxes. The near fool-proof control instruments continue to operate and safeguard the short-time, high-temperature aseptic canning line at Barron Cooperative Creamery, Barron, Wis.

Novel in this operation, installed by Dairy House*, are the sequencing timing controls. They were developed by W. F. & John Barnes Co., Rockford, Ill., for taking over the aseptic canning of 60 cans (8 oz.) per min. of chocolate-flavored drink, called Dari-Shake.

*Subsidiary of Bowman Dairy Co. & Bowey's, Inc.

Thus, all steps are accurately timed in precisely coordinated sequence, eliminating human errors and assuring a consistently uniform quality in the heat-sensitive drink.

If there is a secret to Dairy House's success, it is neither deep nor dark: Good planning and sound engineering have made possible a reliable control method that is completely centralized.

Pushbuttons Do It

To operate this system, the attendant merely pushes one button, then another. First, the entire system is sterilized, then the drink-canning operation proceeds.

From an insulated stainless steel mixing tank (440 gal.), beverage is delivered at a 210-gph. rate by a high-pressure pump (1,500-2,500 psi.) to an 8-section tubular-type verti-

BRAIN of "supervised process" is control panel. Shown are alarm (top left) and automatic temperature recorder-controller (top), with 8-point strip-chart recorder (below). Small light bulbs on left and right sides of panel indicate whether temperatures of several critical areas are high enough. Also on panel are alarm light, manual-automatic control switch, safe-canning light, etc. Schematic drawing (bottom) of processing and canning equipment, product lines, and service connections has toggle switches for manual operations of valves, motors, etc. Indicator lights adjacent to toggle switches show which are actuated both on manual and automatic control.

cal heat exchanger. Here, the drink is heated to 290 F. in three sections, held for a few seconds in the fourth to insure sterility, and rapidly cooled to 50 F. in the last four.

Cans are continuously sterilized in a steam-heated unit and aseptically conveyed to the filler to receive the cold sterile drink. Then filled cans are conveyed in a sterile atmosphere to receive sterile covers.

Pressing a button at the end of the work-day stops canning operations.

There are 46 control devices on the canning line—18 solenoids, 10 timers, 10 temperature-actuated switches, 4 motor starters, 3 limit switches, and 1 pressure switch.

Although this plant instrumentation—first commercial process-sequence control installation in a food plant—was designed after the original pilot-plant prototype (FE Oct. '53, p. 102-105), it is much more simplified. Basically, the same controls are employed, but with modifications.

For one thing, the massive control console has been incorporated with the graphic panel for process control, along with the temperature recording-controlling instrument. This instrument consists of a multi-point strip chart to record temperatures at eight critical points—can-sterilizer steam, can-sterilizer duct, lid-sterilizer steam, lid-sterilizer duct, filling section, filler nozzle, product-heater outlet, and closing machine.

This eliminated as many as 135 wires and 45 ft. of conduit. The size of the panel has also been reduced through use of smaller relays and switches. As a result, installations can now be made in the field much faster and more economically.

After the canning machine is brought to a sterilizing temperature, an air-operated temperature recorder-controller energizes a solenoid that sets the instrument to control temperature (300 F.) in the product heater.

Graphic-control panel is hinged for easy maintenance, such as changing defective toggle switches and pilot lights. Toggle switches, too, are water-proofed.

Maintaining the controls is relatively simple, inasmuch as the installation has a test-light-and-probe system for checking each contact in the complete electrical circuit. Speedy trouble checking in the control system is achieved by referring to a schematic diagram and test-probing numbered wires on terminal strips in the panel.

Used in conjunction with the schematic diagram, to aid in trouble shooting, is a machine diagram duplicating the one on the graphic panel. Superimposed here are all electrical parts, with terminal numbers and symbols.

As an illustration, let us assume that the release-can light is out on the graphic panel. Operator then refers to the release-can section on machine diagram for symbol and terminal number. He then examines the schematic diagram to learn how to check with test probe through the circuit to locate the trouble. Once spotted—say it's a faulty solenoid—he then refers to an itemized parts list to obtain a replacement.

A run-down on how the sequence control system operates in carrying out different phases of aseptic canning is presented in the following section.

How Sequence Control Operates

1—STERILIZING

The operator presses the "Sterilize" pushbutton on the control console to sterilize the canning line and ready it for operation. Then, in turn, these steps follow—

A motor starts the exhaust fan (1).** Then steam-supply valve (2) opens and, when steam pressure at discharge of superheater (3) operates a pressure switch, gas-supply valve (4) opens.

A timer now starts, and when it times out after 25 min., the closing machine (5) and take-away conveyor (6) begin running. In turn, steam supply valve (7) to heat-exchanger opens, pump (8) starts, and air-supply valve (9) opens.

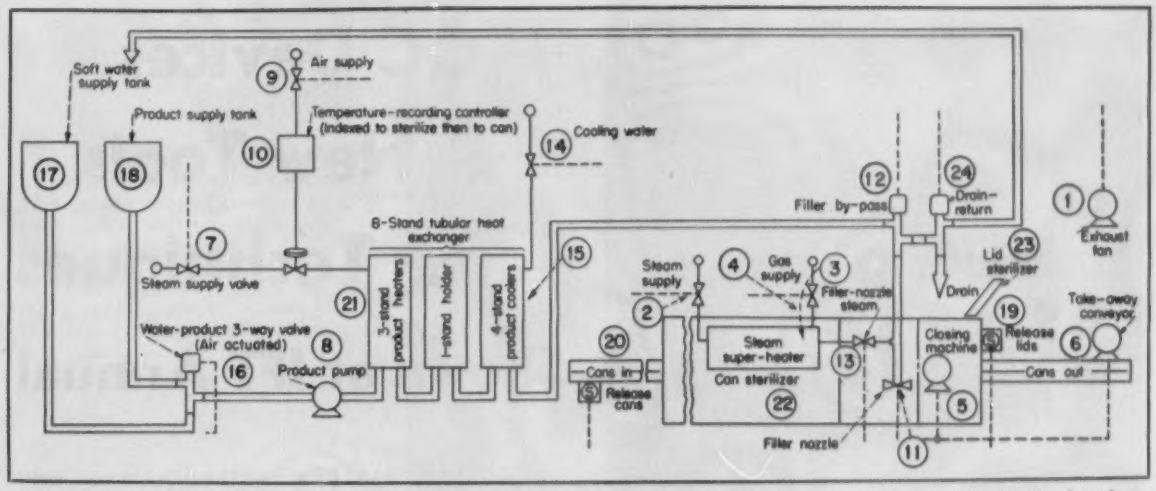
Temperature recording-controlling instrument (10) is then automatically set to sterilizing temperature (300 F.). And hot water (300 F.) under pressure now circulates through the aseptic canning system to the filler nozzle (11).

When nozzle temperature reaches 270 F., a second timer starts. After timer (set for 5 min.) times out, filler by-pass 3-way valve (12) shifts from filler to by-pass. Next, filler nozzle (11) and filler nozzle-steam valve (13) open. Super-heated steam now flows through filler nozzle (11) to further sterilize it to 300 F. The temperature recording-controlling instrument (10) is then indexed to canning temperature (290 F).

Filler nozzle-steam valve (13) now closes, and filler by-pass 3-way valve (12) shifts from by-pass to filler. Cooling-water valve (14) to product cooler (15) then opens. Water now flowing through the system and out of nozzle (11) cools filler nozzle to filling temperature (50 F.).

When all alarm points on the control console are up to temperature, the safe-canning signal light comes on. System is now completely sterilized

**Designating numbers are keyed to schematic drawing.



SCHEMATIC DRAWING illustrates complete aseptic canning system with sequence control. By referring to drawing and text, reader can easily visualize what takes place.

and ready for canning the chocolate-flavored drink.

Temperatures are maintained at 500 F. in the can sterilizer, 450 F. in the lid sterilizer, and 250 F. in the can-closing machine.

2—CANNING

With the safe-canning light on, operator then presses the "Start Canning" pushbutton to initiate these steps:

Water-product 3-way valve (16) shifts from the 50-gal.-capacity stainless steel water-supply tank (17) to product-supply tank (18). Two timers then simultaneously start. When the first times out, a release-lid solenoid (19) is energized. When the second one times out, a release-can solenoid (20) is energized.

Product is thus precisely timed to discharge from filler nozzle into an empty sterilized can, which continues to seamer, receives a sterilized lid.

Machine is now in the canning cycle and will continue to operate, provided there are no alarms.

3—GOING TO ALARM

Should the temperature drop at one of the alarm points—product heater (21), can sterilizer (22), lid sterilizer (23), or closing machine (5)—or should a motor become overloaded, an alarm horn sounds, a red light comes on, and the corresponding green light goes out.

Operator then checks the alarm and corrects the trouble (if possible) before timer times out. Or, he may press the "Stand-By" pushbutton to put the system on water.

Even if he doesn't clear up the difficulty before the timer times out (30 sec.), then the system automatically goes into "Stand-By."

4—GOING INTO STAND-BY

The following initiates a stand-by cycle to put the system on water:—(A) pressing stand-by pushbutton, (B) temperature drop at product heater (21), (C) temperature drop in filling section, and (D) alarm timer timing out (indicating one of alarm points has dropped to critical temperature).

Here's what takes place when system goes into stand-by:

Water-product, 3-way valve (16) shifts from product supply (18) to water supply (17). Next, filler by-pass valve (12) switches from filler to by-pass, and drain-return 3-way valve (24) goes from drain to return. Flow of lids and cans are then halted.

A timer now starts. When it times out—indicating product in line has returned to product supply tank (18)—drain-return 3-way valve then switches from return to drain. Water now circulates in system as long as operator wishes.

5—RE-STERILIZING

If the temperature should drop in the product heater (21), the entire system automatically goes into "Stand-By" and the "Re-Sterilize" light goes on. System must then be re-sterilized. Operator presses "Sterilize" push-button and the machine repeats all steps necessary to sterilize the entire aseptic canning system (as previously noted).

6—RE-STERILIZING NOZZLE

If the temperature should drop in the filling section or the cover in this section of the line is opened, the machine then goes into stand-by and activates the re-sterilize filler nozzle light on the control console. Filler nozzle must be resterilized. Operator presses "Resterilize Filler Nozzle" button. Cover must then be closed or push-button is not effective.

Filler nozzle steam valve (13) opens, allowing super-heated steam to flow through nozzle. When temperature of filler nozzle (11) reaches 300 F., filler nozzle-steam valve (13) closes. The safe-canning signal light then comes on, provided all alarm points are up. Operator may then resume canning operations.

7—SHUTTING DOWN

At end of canning operation, operator presses "Shutdown" pushbutton, and then—

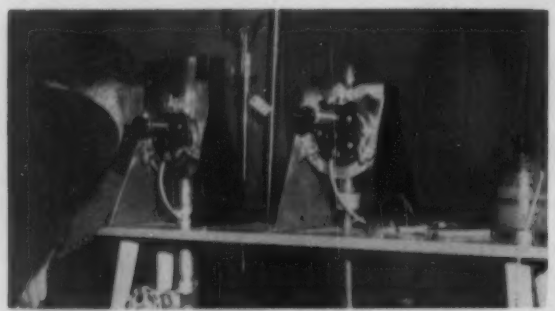
Water-product 3-way valve (16) shifts from product to water. Two timers then start. When the first times out, flow of lids (19) and cans (20) halt. Then, when second timer times out, closing machine (5) take-way conveyor (6) and exhaust fan (1) stop. Also, steam-supply valve (2), gas-supply valve (4), and cooling-water valve (14) close.

Temperature recording-controlling instrument (10) set-point is then indexed to clean-up temperature (230 F.).

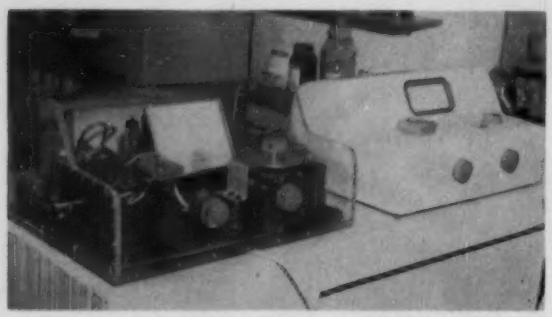
After this, clean-up light on control console comes on and circuit sets up for manual control of clean-up.

★ QC Devices
★ New Tools
★ Techniques
Shown at IFT Annual

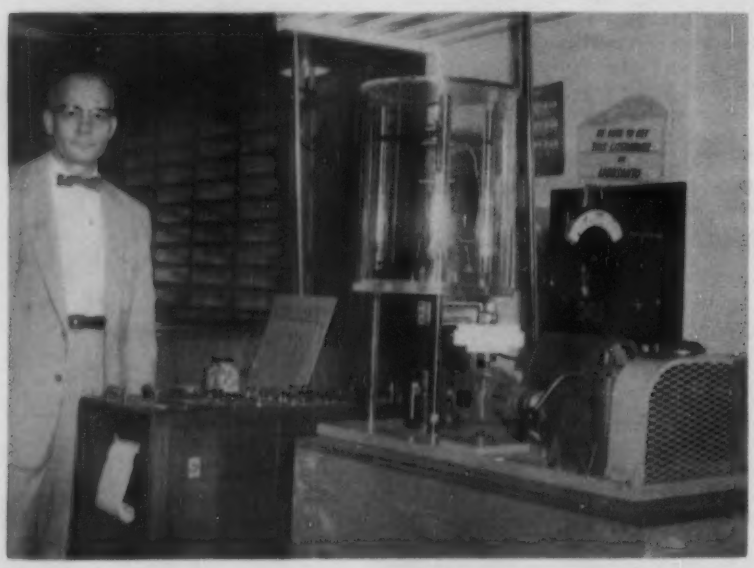
QUICK COLOR CHANGES are easily studied by new Rapid Scanning Spectrophotometer (left) that produces complete absorption curves on cathode ray screen, repeats them 60 times per sec. Other applications: Studying rapid changes in chemical or biological materials; screening or sorting samples; monitoring flowing process.—American Optical Co., Buffalo, N. Y. (58A)



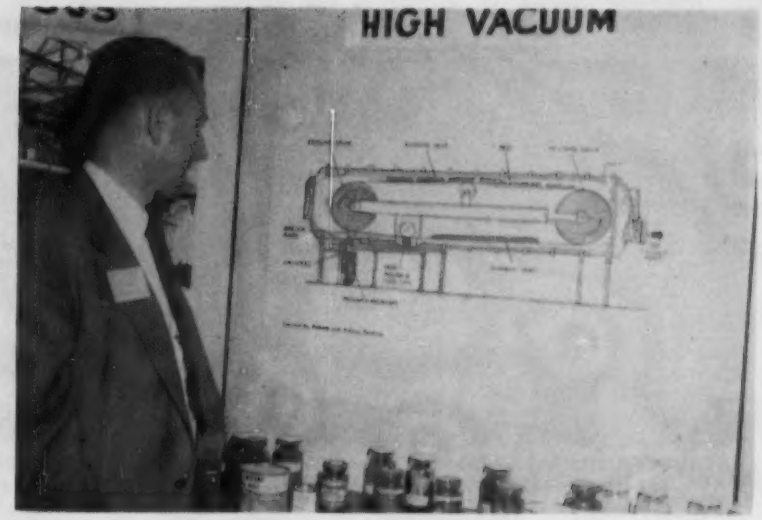
IN-LINE REFRACTOMETER gives direct reading of total solids in semi-liquids. Unit fits flange welded to opening in cooking vessel or pipeline. Hand operated wiper brings fresh liquid to face of prism for easy reading. Applicable to jellies, jams, pastes, purees, dairy products.—Goldberg Instruments, Ltd., Tariffville, Conn. (58B)



NO SPECIAL SKILL is required to operate this spectronic colorimeter. Quick easy readings—in optical density or percent transmittance—are taken direct from scale in the colorimetry. In spectrophotometry, absorption measurements are pinpointed between quickly selected settings —Bausch & Lomb Optical Co., Rochester, N. Y. (58C)

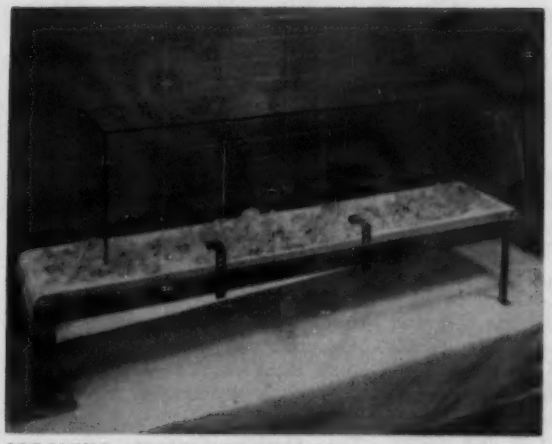


RESONANCE ELASTOMETER (left in photo) comprises unit for measuring viscosity of cake batters to show effect of leaveners. Recording is on tape or graph-paper. Sample in motor-oscillated cup (in cylinder, center) swings a bob at varying frequencies, thus giving direct index of elastic properties. —Monsanto Chemical Co., Inorganic Div., Dayton, Ohio. (58D)

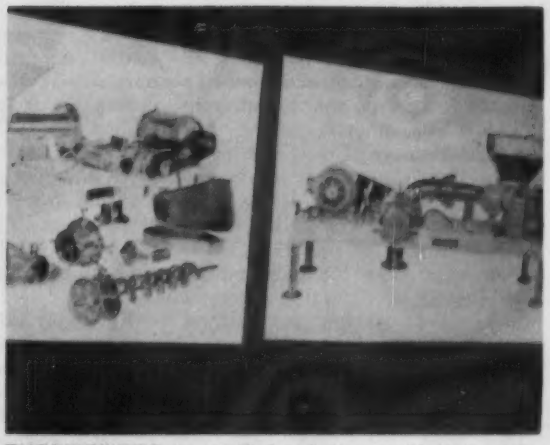


CONTINUOUS VACUUM DEHYDRATOR (shown diagramatically) handles such heat- and oxidation-sensitive products as coffee extract and citrus juices. It has capacity of 300-1,000 lb. dry product per hour. Pilot unit having 1/16 capacity of above is also available.—Chain Belt Co., Milwaukee, Wis. (59A)

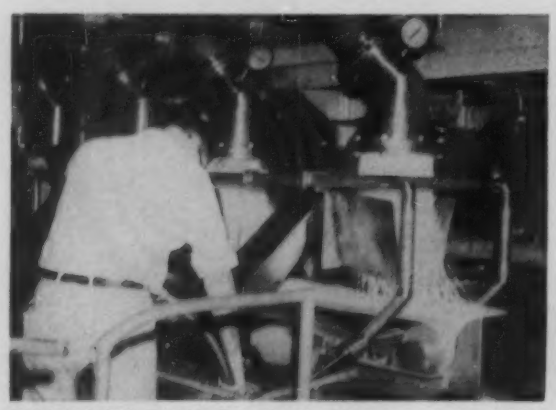
TEST revealing a person's sensitivity to elusive odors—a requisite for flavor-profile panel members—proved very popular with show-goers. Revolving compacts containing "powder puffs" saturated with familiar flavor essences were opened and smelled in sequence (as seen here). Demonstrated by Arthur D. Little, Inc., Cambridge, Mass. (59B)



SPRAYING of antioxidant solution on potato chips, as they are conveyed under transparent hood, is portrayed in this special model. Technique also applicable to many cereal and grain products.—Eastman Chemical Products, Inc., Kingsport, Tenn. (59C)



THERMINUTER (assembled and disassembled) is variation of standard comminuter to process products under heat and pressure. Available in 20-200 hp. ratings. Withstands 150 lb. pressure, and 300 deg. F.—The W. J. Fitzpatrick Co., Chicago. (59D)



EXTRUDERS attached to heat-exchangers form chilled gelatin into long "spaghetti" strands.

OSCILLATING BELT uniformly spreads strands on conveyor traveling through continuous dryer.

NEW DRYING TECHNIQUES Save Costly Process Time

Much more product surface is exposed by continuously extruding gelatin in spaghetti-like strings—thus slashing old tedious routine fully 80% . . . Also, material is more uniformly spread by oscillation . . . And with new chemical dehumidifiers in action, weather makes no difference

JOSEPH H. COHEN

General Manager, Atlantic Gelatin Division, General Foods Corp., Woburn, Mass.

Drying of gelatin has always posed knotty problems.

When done batchwise—a slow, costly procedure requiring excessive equipment, floor space, and labor—it's difficult to control and to integrate smoothly with other operations. Another disadvantage of the batch method is that it exposes insufficient product surface for rapid drying. And in our case, it left us at the mercy of adverse weather conditions.

Nor were these the only hurdles that stymied us. Gelatin is extremely heat-sensitive. So low temperatures must be used in either batch or continuous systems. Maximum permissible temperature for gelatin in the wet stage is about 120 F.

But now, these roadblocks are things of the past. For we've come up with a continuous, fully automatic, low-temperature drying method. This is advantageous in four ways:

1. **It cuts drying time six-fold**
2. **Saves labor and floor space**
3. **Is independent of weather conditions, and**
4. **Meets our rigid sanitary requirements**

These benefits stem from precise control of drying temperature and humidity by means of four Kathabar dehumidifying units (Surface Combustion Corp., Toledo, Ohio). Positioned adjacent to our continuous dryer, they chemically remove excess moisture from incoming air to increase dryer effectiveness.

Straight-Through and Non-Stop

Effectively catalyzing the drying is a new technique designed for exposing maximum product surface. Employed are continuous Votators that chill and solidify the clarified, concentrated gelatin solution in a matter of seconds. These units extrude gelatin in the form of small-diameter, lacerated strings resembling spaghetti.

Efficient drying takes place in our specially-designed, double-unit dryer.

The first unit consists of three sections, each equipped with two large circulating fans. It is furnished with dehumidified and heated air. The second three-section unit operates on recirculated heated air.

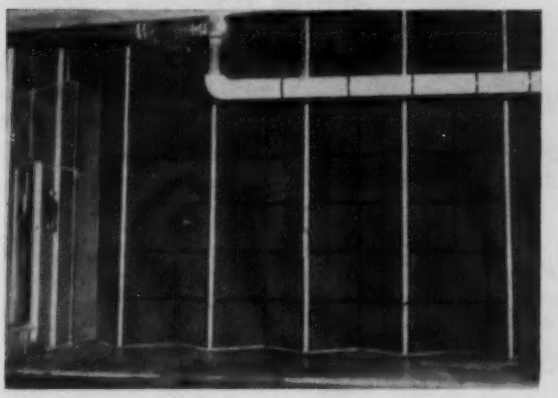
From extruders, an oscillating-type conveyor uniformly distributes spaghetti-shaped gelatin onto a 10x65 ft. stainless steel wire-mesh conveyor traveling through the first 3-section unit of the dryer. It takes less than 1 hr. to dry the bed of traveling gelatin to a semi-dry state.

This semi-dried gelatin then is automatically distributed on another stainless steel, perforated, 65-ft. belt that continues through the second 3-section unit. Here, final drying to 90% solids takes less than 4 hr. Moisture-laden air is exhausted at three points.

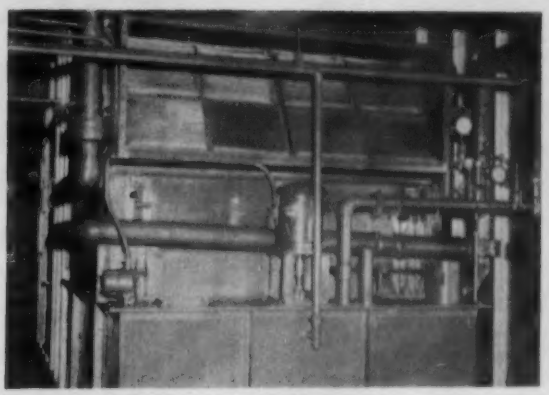
Time Slashing Factors

Key to drying in this continuous system is use of an advanced chemical dehumidification technique which

Gelatin Through In Mere 4 Hr.

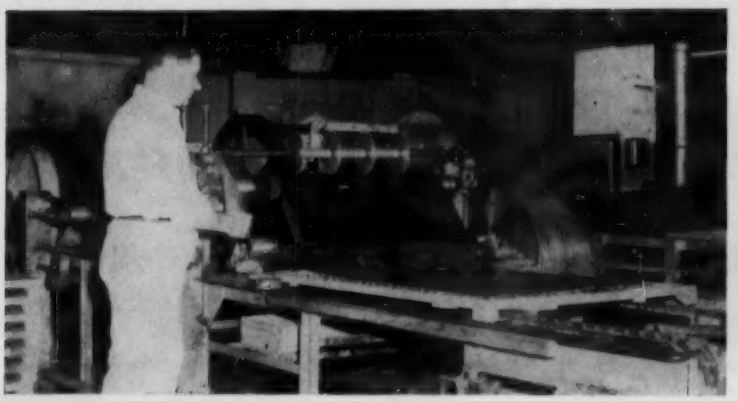


INCOMING AIR is freed of impurities as it passes through this huge filter on way to dehumidifier.

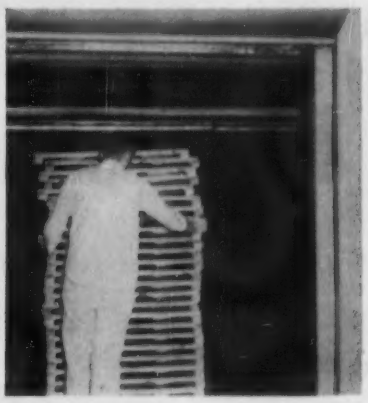


DEHUMIDIFYING unit (Kathabar) employs moisture-absorbing lithium chloride solution.

—Whereas This Batch Way Stretches to 24 Hr.



SOLIDIFIED GELATIN leaving cooling tunnel is slit into strips by four circular knives, then cut to length and loaded on drying nets.



DOLLY-LOAD of gelatin is pushed into batch-type drying tunnel.

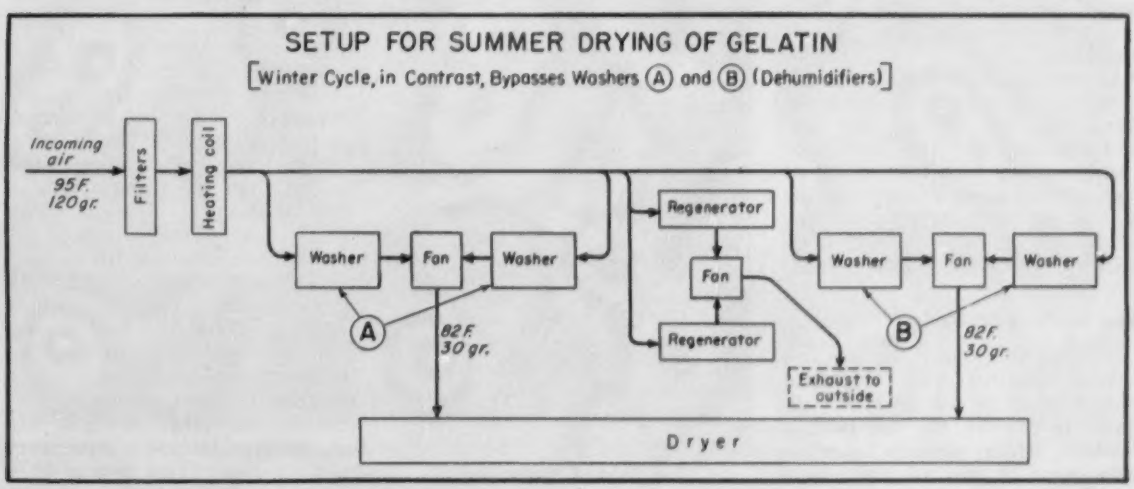
keeps humidity at the optimum level, independent of weather conditions.

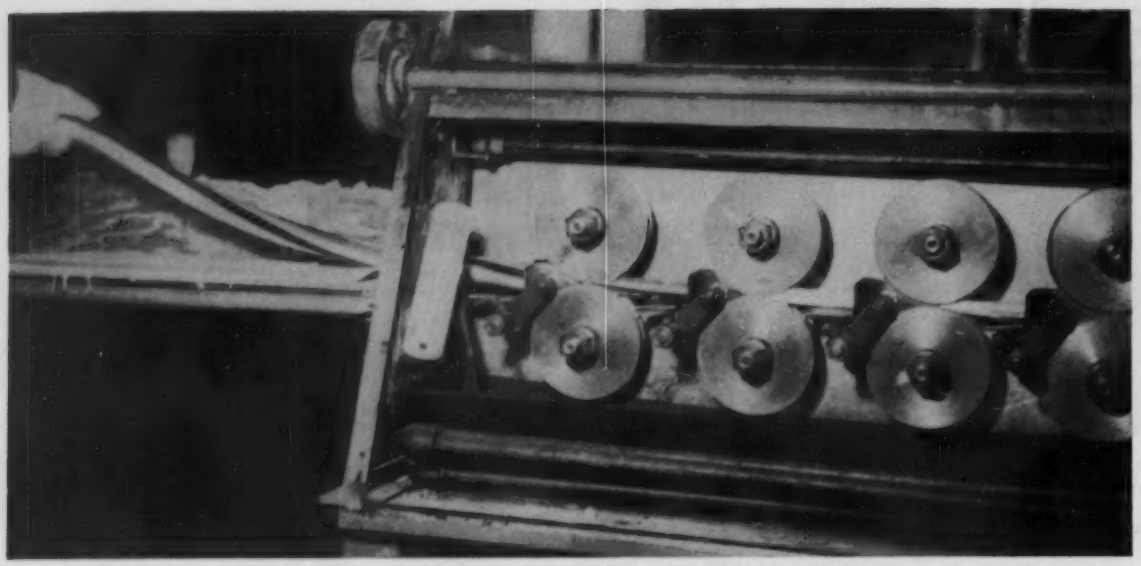
It is use of this method that has cut time required to dry gelatin from about 24 hr. to less than 4.

Humidity of the drying air is controlled with non-vaporizing lithium chloride, which was specially selected for its high moisture-absorping capacity and ease of regeneration.

Moisture content of air leaving the washers (dehumidifiers) and entering the dryer is regulated by the temperature of the lithium chloride solution.

(*Turn to page 86*)





1 SPUN by hand into these sizing rolls, this "rope" of peppermint candy is brought down to uniform 13/32-in. dia. It will not be handled again until it leaves the new twisting machine.

Stick-Candy Making *Mechanized*

Product Now More Uniform . . . Irksome Labor Abolished

RAY BLOOMBERG
FE Correspondent, Seattle

One of the most difficult confection operations to mechanize has been the production of stick candy which, traditionally, has been twisted and wrapped by hand.

■ **Now, however, Brown & Haley of Tacoma, Wash., has devised and built machines that eliminate the hand labor of twisting and wrapping—and, what's more, increase output almost four times.**

■ **And today, a single B &H shift with a smaller crew produces 2,500 lb. of this candy, with consequently lowered unit costs.**

Patents have been applied for on both of the machines, which were developed by N. S. Bestoso, company chief engineer. And new models are being readied for sale to confectioners.

The Machine Method

Twisting stick candy manually is a tedious operation, and the helical shaped stripes of red are rarely uniform. In contrast, the new twisting machine, which provides one complete spiral of the red stripe in a 4½-in. stick, eliminates the old labor and produces a stick of uniform design and diameter.

In brief, an 85-lb. batch of candy is hand-spun to ¾-in. dia. and fed into a series of six pairs of sizing rolls. These reduce it to $\frac{13}{32}$-in. It is then automatically pinched into the proper lengths (1-in. up to 8½-in.) between two circular steel cutting rolls. The impression of the cutting rolls is not deep enough to make a complete cut, so the candy enters the twisting machine in one long roll.

The finished confection.

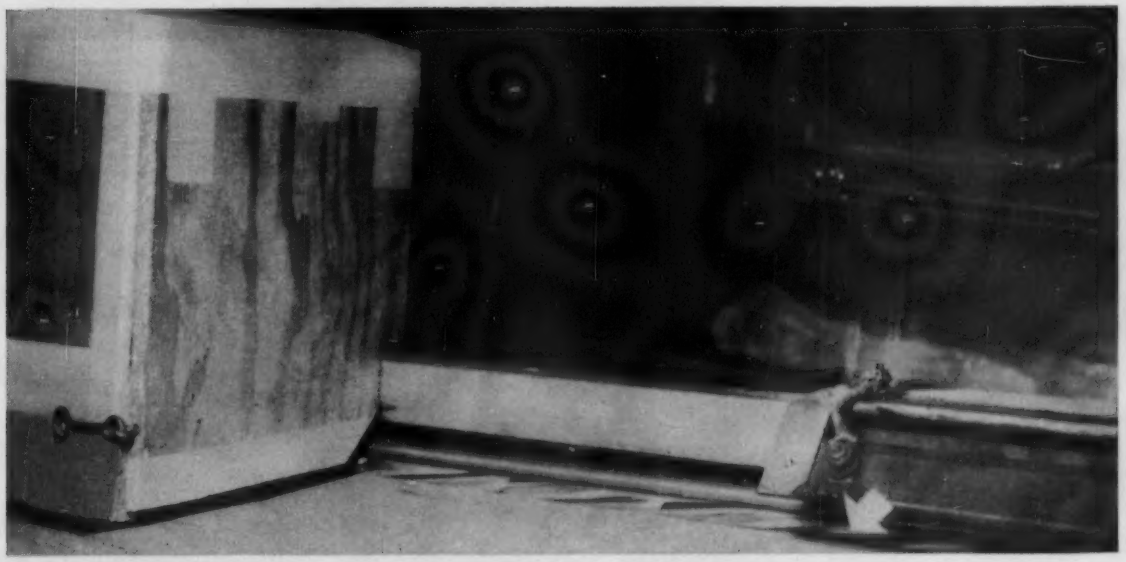
The twisting machine consists of a series of five endless belts, each set at an angle of 20 deg. from a counter-rotating 10-section, steel rod 30-ft. long and of $\frac{13}{16}$-in. dia. The first belt moves about 1% faster than the cutting rolls, and the speed of each succeeding belt is stepped up another 1%, to keep the candy moving along without piling up.

The steel rod, located just above the surface of the belts, turns at a speed greater than that of the belts. Thus, the candy is kept from squeezing beneath it. The rod is powered by a ¼-hp. motor.

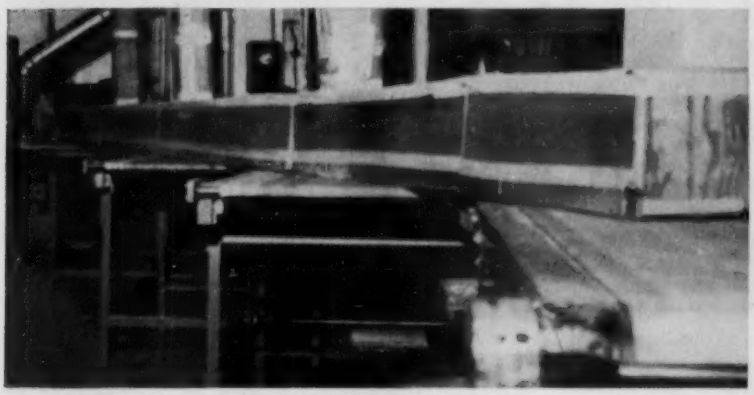
As the candy rolls out onto the first belt from the cutting rolls, at a rate of about 125 fpm., it passes beneath an aluminum gage-roll mounted on a lever that has an electrical connection to a small light bulb above the sizing-rolls cabinet. Accordingly when the candy is spun to the right proportion, the pressure on the gage-roll keeps the circuit closed and the light glowing.

Should the candy be spun too thin, however, the candy-rope passes

(Turn to page 143)



2 **PINCHED** at proper stick-lengths between two cutting rolls, the rope (arrow) now moves onto the first of five belts and is guided into a refrigerated tunnel by a rotating steel rod.

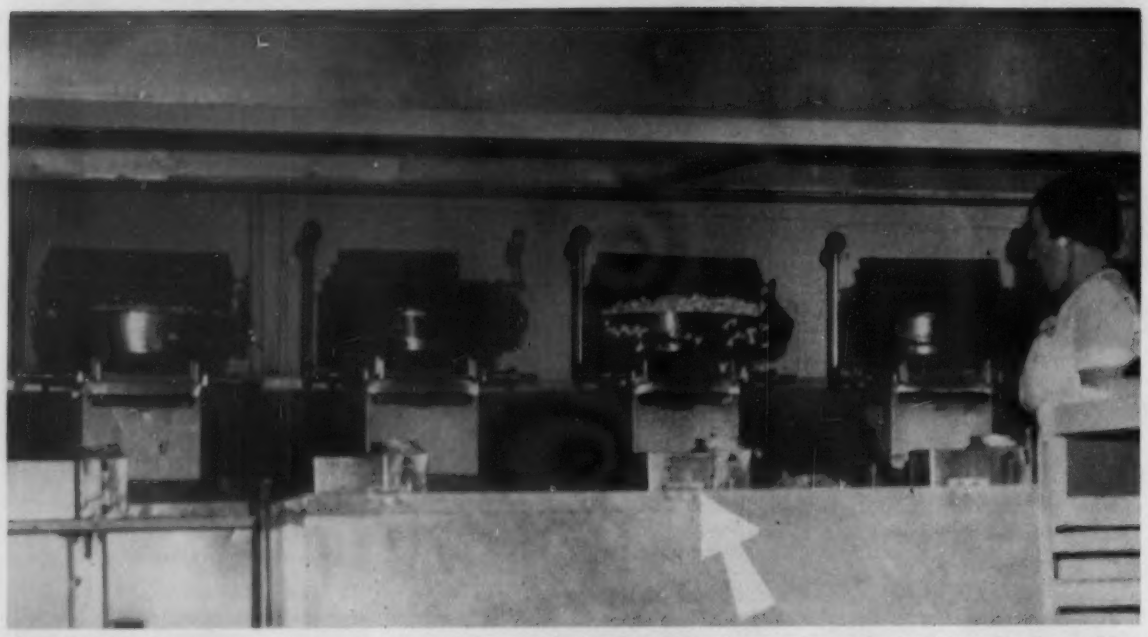


3 **THE CANDY** is then cooled by 2,300-cfm flow of refrigerated air as it moves along rod through this tunnel on series of angled belts.

4 **AND IT BREAKS** to stick lengths as it leaves the final belt.

5 **NOW IT IS FED** into new automatic machines that wrap it with cellophane (note rolls, left). Rate: 135 a minute. (News-Tribune photo)

6 **FINALLY,** candy goes to packer on belt that counts out sticks.



WET POPPERS are consecutively charged with corn and oil from measuring scoops and cups (arrow). Large bin (foreground) holds daily corn supply. Popcorn discharges from units to a conveyor below chutes.

Small Plant Revamping

- **Unshackles Unit Operations**
- **Steps Up QC and Sanitation**
- **Streamlines Product Flow**
- **Coordinates Maintenance**

DON MAYBORN and ROBERT J. KELSEY

Respectively, Manager, Cornco, Inc., Baltimore, and Assistant Editor, "Food Engineering"

Space and equipment limitation is the common plague of the small company.

Even so, the small company can have big ideas—and profit by them. In short, a generous helping of native ingenuity, sprinkled with common sense, can lick such restriction.

Take Cornco, Inc., of Baltimore. It started its popcorn processing as a very tight one-room operation. And it seemed that each problem solved along the way merely raised other problems.

Initial product handling, using conventional conveyors, was "equivalent to employing a bulldozer to push a marble." Sanitary measures were both costly and inadequate, due to old-style equipment design and limited facilities.

But let's run through the various factors one at a time:

Space Problem Solved

The matter of "operating elbow room" was quickly taken care of by construction of a second floor, along with a special insulated room for corn and cellophane storage.

Even here, toes were stubbed. In order to get the necessary building permits, a vapor disposal problem, involving eye-smarting organic acids from the cookers, had to be surmounted. However, cooperation by Westinghouse resulted in the development of a stack-contained unit utilizing banks of ultraviolet tubes to convert irritants to harmless vapors.

From Belts to Air

For product handling, a blower system was finally selected as the most efficient and economic means for moving the light fragile popcorn. Here, the tubing was constructed for quick disassembly to facilitate cleaning.

Plus-advantage of the system has been a substantial reduction of product damage.

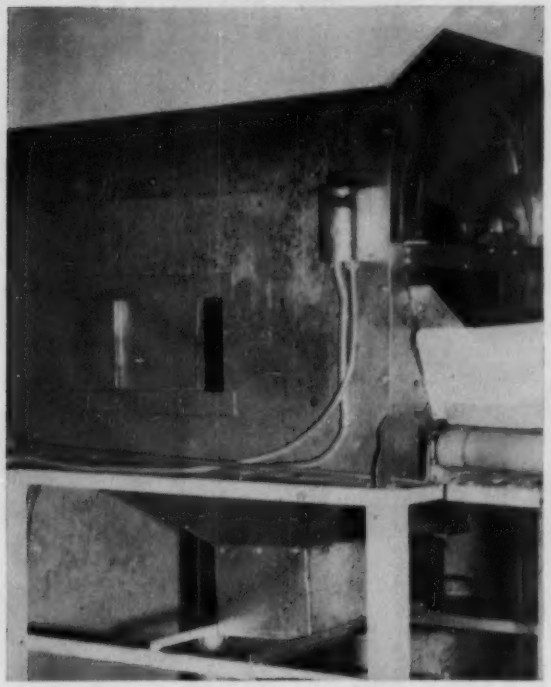
Further blower benefits were quickly realized. Whereas infra-red lamps formerly were installed over a belt conveyor to dry the fresh-popped kernels, this is now automatically taken care of by the blower. Also, the hot product is cooled at the same time, preventing condensation of moisture after bagging.

Nevertheless, two other problems were introduced. For one thing, cool winter air chilled the blower pipe, causing small amounts of coconut oil vapor to condense and choke the tube.

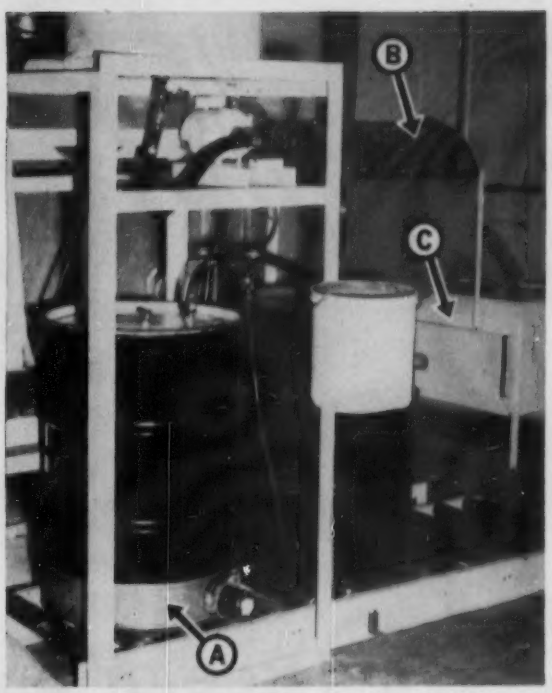
After some experimentation, five electronic heating bands were installed around the pipe—thus averting the chill.

Another problem arose due to popcorn breakage. Formerly, many kernels were broken in conveyor pulleys.

Was Given New Efficiency



DRY POPPER puts corn in direct contact with gas flame. Kernels pop up through two concentric screens, and are discharged by an inner cone-shaped screen.



COCONUT OIL (melting point 72 F. is quickly liquified by electronic heating band (A). Pump feeds upper supply barrel. Note corn grader (B) and blower (C).

These fell on the floor, thus were not included in the final product.

With the new blower system, decidedly less crushing occurs—but some broken particles now travel with the kernels to the cellophane bags. Thus all popcorn must be screened before packaging.

To solve this, a current project seeks to decrease velocity of the particles while maintaing movement of the corn. This will eliminate product damage.

Spur to Quality

Product control initially consisted merely of testing each new shipment of corn for infestation and rodent contamination. Today, there are additional steps.

A sample of each lot of coconut oil is sent to a consulting laboratory for complete analysis. And moisture content of the corn (controlled at 12½-13¼% by weight) is determined daily. Also, the finished product is taste-tested twice a day to insure constant uniformity.

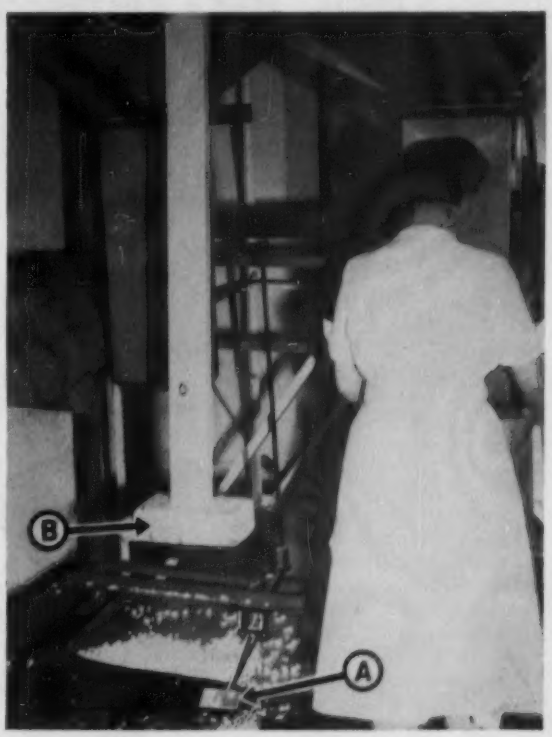
Filling control presents a unique problem in this field. Corn is normally measured by the ratio of final to primary volume. A 35-to-1 popping ratio is considered commercially good. New corn hybrids may go even higher. However, large fluffy kernels, produced from top quality corn give under-weights—even in "cram-full" bags.

Thus popping volume, which is effected by a wide range of conditions, must be carefully controlled to assure optimum quality while fulfilling weight requirements.

Active Sanitation

The plant's cleanup routine was hampered from the start by totally enclosed equipment, which provided no access to dirt-and-oil-catching corners. Hot water and detergent were

(*Turn to page 197*)



BULK PACKAGING in operation. Popcorn discharges to these twin hoppers. Note pedal (A) for operation of filler slide-valve. Post (B) opens bags. Subsequently, filled bags are sealed with gummed paper, then folded and resealed across the end to assure an air-tight package.

CAPACIOUS new car that guards frozen foods at sub-zero temperatures. Self-contained refrigerating unit is mounted behind grille (right). It runs for 12 days on fuel fed from tanks (under car). The plus-protection shipping is believed to cost no more than old ice-bunker service.

This Reefer Spells New Safety For Frozen Food Transport

Cross-country fleet of 30 diesel-freezer cars carried record low-temperature loads... First units to be joined by 155 more

FE STAFF

Long-haul protection for frozen foods has been decidedly increased now that Santa Fe Railway has its new MTC (mechanical temperature controlled) cars rolling.

Equipped with self-contained refrigerating systems, these units are designed for super-safe transportation of frozen foods.

Thirty of the giant cars are now averaging ten to twelve regular trips each between east and west coast terminals yearly. Since June, 1953, 552 carloads of frozen commodities have been moved in the new-style carriers alone. And to handle the mushrooming business, Santa Fe plans construction of 155 more units this year at its West Wichita car shops.

Huge Capacity

Cars are entirely new, from roller-bearing trucks to wide, icicle-painted sliding doors. Inside length of 44 ft. provides 3,054 cu. ft. of load space. Thus, cars can carry up to 127,000 lb.

In fact, the first shipment (in 1953) from Snow Crop, Modesto, Calif., to Jersey City, totaled a whopping 126,073 lb.—and was kept below 0 F. the entire way.

Temperatures can be closely controlled anywhere up to 55 F. for carrying fresh produce, but cars are held sub-zero for optimum protection of frozen goods.

Plywood side-wall racks, metal floor racks, and strap anchors keep pace with modern materials handling methods.

A log book travels with the car (which makes up to 7 stops at inspection points located across the country) for keeping track of operating data. Regular pre-trip, monthly, bi-monthly, and semi-annual maintenance inspections keep equipment in tip-top operational shape.

Even if equipment failed, there would be only a negligible rise in temperature. For tests indicate that low load-temperature plus the thick car insulation (running to 8 in.) would hold temperature climb to a minimum.

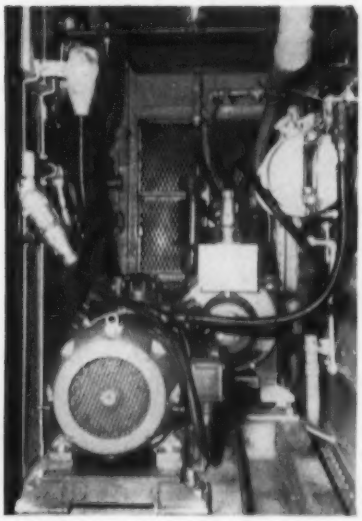
Freezing System Data

Refrigeration equipment is located at one end of the car behind an insulated bulkhead, and it requires only slightly more room than the old ice bunker.

Cold air is discharged into a shallow plenum chamber formed by a false ceiling. This is perforated with small holes throughout length and width to provide a pressurized distribution system. Some air is free to percolate down through the load, while the remainder flows down sidewall spaces and returns under the floor racks to the cooling coil.

Besides insuring uniform temperatures, this arrangement gives means for cooling products, if necessary, while

CONTROL panel is located outside car. It's checked regularly by trained personnel as car moves across country. Running time between inspection points averages 24 hr. Large gage (left) indicates load temperature.



COMPRESSOR and diesel generator form two compact units, easily removable by fork truck for servicing.

maintaining a moving film of cold air surrounding the load.

Design specifications provide a substantial refrigerating reserve over minimum requirement—even in the hottest weather.

Data was gathered after World War II in a prolonged study that included the building of an experimental car, complete with equipment and test instruments. This car made several trips, accompanied by test engineers. Also, there were numerous stationary tests involving continuous data recording.

Power is supplied by a 40 hp., 2- or 4-cycle diesel engine—directly connected to an alternator. Engine operates on diesel locomotive fuel carried in four, 100 gal. tanks located under the center of the car. Storage batteries are also carried here.

The alternator is designed for 25 kw., 60-cycle, 220 volt, 3-phase current. A Freon-12 compressor, powered by a 15 hp., totally enclosed, high torque motor, has a capacity of 26,000 Btu's per hour (at −20 deg. evaporating and +120 deg. condensing, saturated refrigerating temperatures).

All coils in the 800 sq. ft. of condensing surface have copper tubes and fins. A condensing medium is provided by 7,000 cfm. of air, drawn through both sides of the car past dynamic grilles and panel filters. It first passes upward through the condenser (horizontally mounted above the engine), then it goes through the radiator, which is incorporated in the condenser frame. Air is finally discharged vertically through a single roof-hatch by a 5-hp. exhaust fan. This circulation method was adopted to avoid adverse effects of side winds, as well as the nuisance of air blasts at lower levels.

The evaporator contains 550 sq. ft. of total surface, over which blows 4,000 cfm. of air.

Evaporators and blowers are located in an insulated well behind the load bulkhead. Blowers are belt-driven by 3-hp. motors mounted in the engine compartment.

Power Cutoff & Defrosting

Auxiliaries of conventional types—such as receivers, filters, heat exchangers, solenoid valves, and expansion valves—are employed. Rubber mounts are used for the power plants and compressor sets. Vibration eliminators and flexible hoses are installed in the various refrigerant lines.

Customary temperature and pressure protective devices are incorporated in the machinery to shut down equipment in event of oil or water-cooling failures. A thermostat-bulb, located in the return air-stream, will control cycling of the compressor between −6 and −12 deg. The engine, and condenser radiator fan operate continuously. Evaporator blowers, also, are in constant operation, except during defrosting periods.

These defrost cycles are automatically initiated by means of a pressure differential switch connected to pressure sensing taps—located above and below evaporator coil. As frost accumulates, air pressure drop across the coil actuates the switch. Compressor and blowers stop, and electric heaters —incorporated in the coil assembly—come into operation to dispose of frost. A timer, also started by the pressure switch, terminates the cycle and restores refrigeration.

This defrost system (6 kw.) is used to provide quick action without materially warming air in the load space.

INTERIOR has side-racks of plywood, floor racks of metal for air circulation and long life.

Although three different makes of equipment are represented in the 30 cars now in use, interchange of power plants or compressors is easy when necessary. These units are each secured by only four bolts. Refrigerant lines to the compressor are joined by self-sealing couplings. Plug and receptacle connectors are used in the power and control wiring. Pipe unions connect water, oil, and exhaust lines.

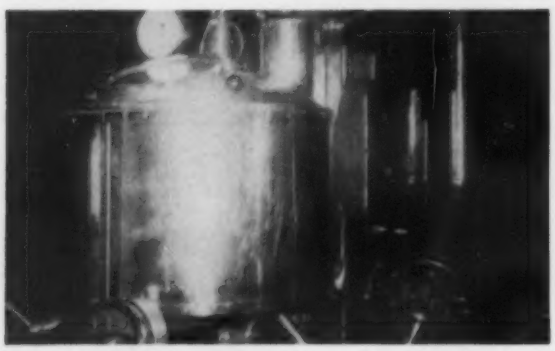
21 New and Improved Units Displayed at Candy Show

Significant advances in equipment revealed at NCA's Chicago exhibit. Faster, more efficient performances targeted in salient operations—

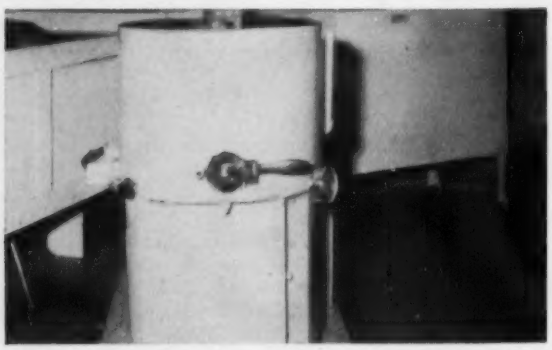
MELTING • COOKING • FORMING • COATING • PACKAGING SEPARATING • TESTING

2 MELTERS:

One delivers dissolved sugar and corn syrup to cooker. Other melts chocolate for coating operations



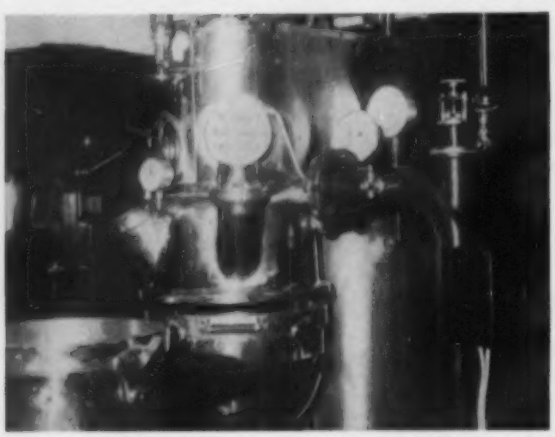
CONTINUOUS premelter water-dissolves starwheel-fed sugar as it travels concentrically through unit. Just before sugar solution leaves premelter, heated corn syrup is introduced. Then 2,000 gal. per hr. are pumped to continuous cooker.—Manufacturer: Racine Confectioners' Machinery Co., New York City. (68A)



NEW chocolate melting and tempering kettle is electrically heated and thermostatically controlled to handle batches from 100 to 500 lb. A sanitary unit for hand-dippers and enrobers, it permits full bottom draining. Mechanisms below kettle are enclosed. Access to tank is easy. Maker: W. S. Smith & Sons, Inc., Phila. (68B)

2 COOKERS:

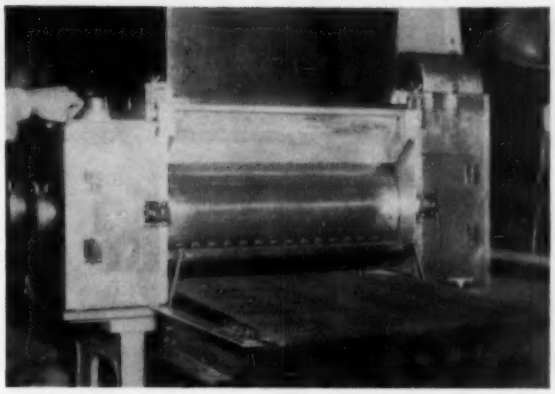
Emphasis is on higher capacities and fully streamlined, sanitary, and controlled operation



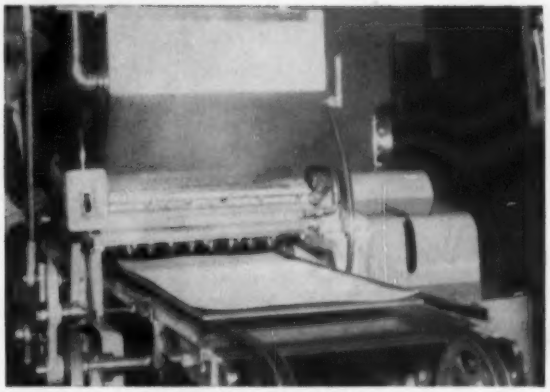
WITH 1,800 lb./hr. capacity, this continuous hard-candy cooker is automatic unit that times cooking cycle, breaks vacuum, and discharges 75-lb. kettle. Batch size also regulated. Coils not under vacuum. Batches may be cooked with a low percent of corn syrup.—Racine Confectioners' Mach'y. Co., N. Y. C. (68C)

LATEST mixer features automatic temperature control and variable speed. Gas-fired cooker-mixer unit is designed for caramel, fudge, nougat, brittle, and gum work. Available with single or double agitators, with improved nickel-alloy scrapers attached to stainless steel shaft. Savage Bros. Co., Chicago. (68D)

2 FORMERS: Stress continuous forming of a variety of confections at higher operating speeds

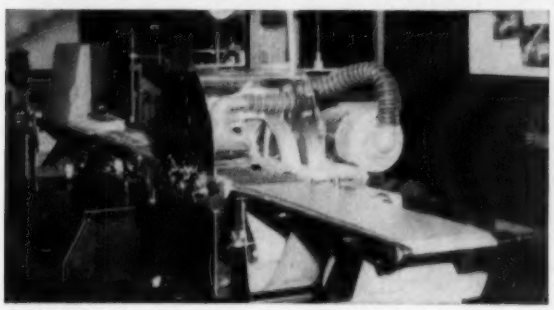


ROTARY MOLDER continuously vacuum-forms centers in cups without distortion. Material is hopper-fed to turning drum that positions it in cups. Centers are deposited directly onto bottomer for immediate coating. Speeds: 1,200-2,500 pieces per min., depending upon size of centers.—Rotary Machine Co., Philadelphia. (69A)



BANTAM UNIT deposits any kind, size, or shape item in all types of molds, foil or paper cups, or onto trays, plaques, or belts. Designed for creams, patties, kisses, pralines, bars, gum drops, marshmallow or nougat pieces, stars, leafs, wafers, nonpareils, etc.—Racine Confectioners' Machinery Co., N. Y. C. (69B)

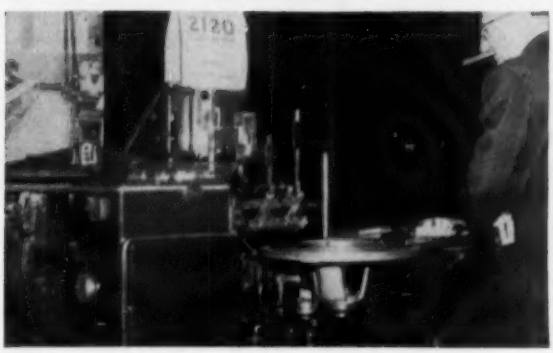
2 COATERS: Specially designed, these units feature sanitary and efficient performance, also flexibility



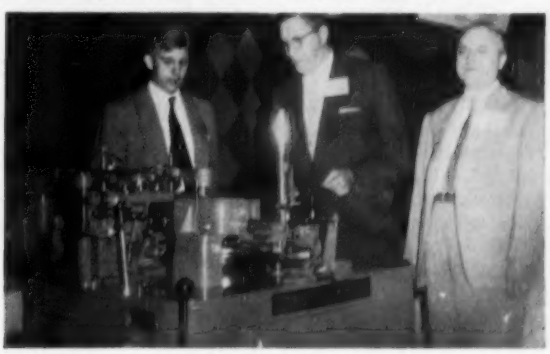
STAINLESS chocolate coater, with 7-in. belt, has accessible tank for quick, easy cleaning. Also there are electric heating coils specially arranged above this machine in order to pre-warm the coating.—National Equipment Corp., N. Y. (69C)

SPECIALLY DESIGNED fondant coater (Danish) for icing and chocolate. Suitable for frosting cakes with variety of colored fondants. Equipment includes blower to equalize spread.—C. Tennant, Sons & Co., of N. Y. C. (69D)

2 PACKAGING MACHINES: Emphasis on higher speeds, precision filling, automatic performance, and sturdy construction

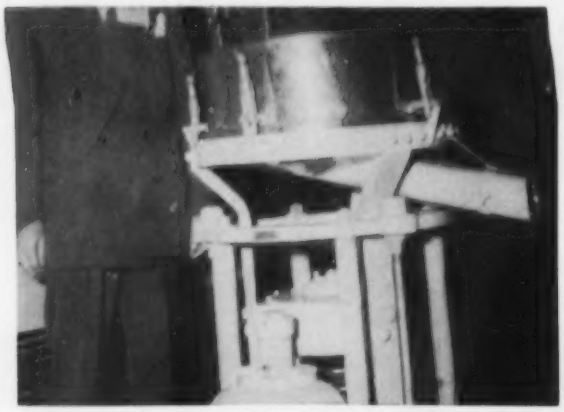


ADJUSTABLE machine foil-wraps and bands a variety of chocolates and similar products. Speeds: Up to 120 per min. on fancy chocolates and 80 per min. on eggs.—Supermatic Packaging Corp., Newark, N. J. (69E)

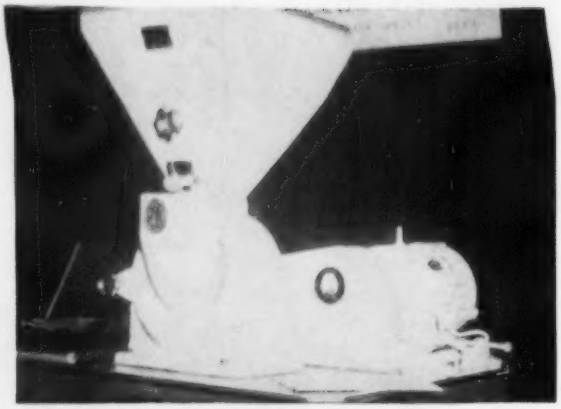


THIS foiling and banding machine is of German make. It handles a number of different-shaped items at rate of 80-85 per-min. Maker: Wilhelm Rasch, Spezialmaschinenfabrik, Koln-Braunsfeld, Germany. (69F)

MISCELLANEOUS: Including sieving machine, sugar mill, electric color grader, and moisture tester

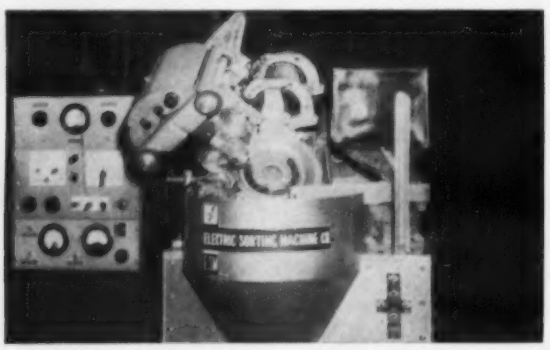


GYRATORY SIFTER reclaims chocolate and removes any foreign matter leaving conches, also cleans nuts, and breaks up sugar lumps. Handles dry or wet products. Portable machine operates in 1,000-3,000 rpm. range. Liquid-straining outputs up to 6,000 gph. Displayer: J. M. Lehmann Co., Inc., Lyndhurst, N. J. (70A)



HIGH-SPEED sugar pulverizer has new turbo-grinding head to assist action. Blower cools air jacket around chamber, and thus the pulverized sugar. Metal-removing magnet built in. Capacity up to 1,720 lb. per hr., depending upon fineness. German-made, unit was displayed by Geveke & Co., Inc., N. Y. C. (70B)

MOISTURE TESTER is built for instant measurement of water content of confections. Here, nine marshmallows are being moisture-tested on assembly employing pair of opposing probes, of which one takes sample temperature. —American Hospital Supply Corp., Evanston, Ill. (70C)



ELECTRIC SORTER continuously separates discolored peanuts and off-type nuts. Of bowl-feed type, machine provides automatic photo-electric sorting, both by relative brightness and hue. Manufacturer: Electric Sorting Machine Co., Grand Rapids, Mich. (70D)

OTHER NEW UNITS SHOWN . . .

ONE-MAN CHOCOLATE COATER for handling 400 lb. of candy pieces per hour. Speed of conveyor varies from 30 to 120 fpm. to suit size and shape of items to be covered. Portable. Unit displayed by C. Tennant, Sons & Co., of N. Y. C. (70E)

CHOCOLATE-PIECE FORMER continuously shapes, without molds, up to 250 lb. of items for pan work. Of French make, unit automatically produces such chocolate types as "lentil," "coffee-bean" and pastille shapes, almonds, etc. Called the Autojep it comprises a chocolate feed device with valve controlled by photo-electric cell, one or more sets of patented rolls with dies, and a cooling unit. Displayer: Jabez Burns & Sons, Inc., N. Y. C. (70F)

AUTOMATIC CUPPING MACHINE that feeds candies and cookies of all sizes and shapes to ten different stations at rate of 500 pieces per min. Machine separates and positions cups for filling from one to ten stations, places product into cup, and delivers package to conveyor. —Mayer Engineering Co., Evanston, Ill. (70G)

FORMING MACHINE to handle fondants of different consistency, including those with fruits or nuts. Unit extrudes many shapes. Items are cut, sliced, or sawed in uniform rows for automatic movement to enrober. Up to 150 rows of centers are made a minute depending upon type of fondant. Displayer: Wermac Co., Grand Rapids, Mich. (70H)

SUGAR-ROPE MAKER (Forgrove) that comprises horizontal batch roller, 4-roll rope sizer, and plastic unit (Forplast) puts out 109 ft of rope per min. at 35 rpm. Exhibitor: Package Machinery Co., East Longmeadow, Mass. (70I)

LIGHTWEIGHT STARCH TRAYS (molded of polyester-resin impregnated glass fiber) that are easy to handle, exceptionally strong, and readily cleaned. Maker: Molded Fiberglass Tray Co., Linesville, Pa. (70J)

SILICONE-COATED PANS for fudge, caramel, brittles, and similar confections. Designed for easier release of candies, they eliminate need of greasing and pan washing. Displayer: National Glaco Chemical Corp., Chicago. (70K)

GAW—Threat or Challenge

To Your Company?

Food executives variously view auto-labor victory as: Spur to stability . . . Compounder of "automation, mergers—and closed plants" . . . An excessive step by minorities . . . And regimentation opposed to free enterprise

But whatever the gage, increasing labor demands and higher consumer prices are imminent—calling for the kind of management planning outlined in this article

IVAN C. MILLER
Associate Editor, "Food Engineering"

Mixed feelings and differences of opinion follow in the wake of the labor-management contracts recently negotiated in the auto field.

In short, you may choose your side. For while some food industry leaders look upon the new situation with apprehension, others are thinking that the future may be faced with assurance.

The latter believe that the price of stable employment, and correspondingly stable production, will remain in line with the gains.

Meantime, there is general agreement among food company executives that though the auto-field contracts provide for a sizable supplement to state unemployment compensation, nevertheless the contracts do not, in fact, *guarantee* annual wages, nor do they represent a surrender of "management prerogatives."

Present and Future

Ford and GMC contracts bring a rise in worker compensation amounting to some 20c. an hour, with fringe benefits accounting for a large portion of it. And viewing its present restrictive form, observers say it might more feasibly be called "GAW Ltd."

Here, one food plant executive goes further: He suggests it be retagged "FITD"—for "foot in the door." And of course his implication is that demands for a truer—and more costly—GAW will in time confront management at the bargaining table.

In fact, the forecasts of many food men parallel this concept. Whatever road the auto-field commitments may take, they see a precedent established for new union demands—next year, if not this year—on almost all manufacturers, including food processors.

Taking hold is a new philosophy carrying grave considerations for all management. For here we find management in a specific forefront industry becoming additionally responsible for providing a certain percent—and probably more from year to year—of the monetary wherewithal of employees at times when there is no work for them, and despite the fact that such lack of work may be due to conditions beyond the employer's control.

Factors at Ford

Highlighted below are provisions in the Ford-UAW contract, an agreement whereby the company sought to avoid placing the organization in a position of "unpredictable or unlimited liability." Similar clauses are found in the GMC contract.

Ford will pay into a trust fund 5c. for every hour worked by every wage earner, at least for the three-year period covered. And there will be two separate trust funds—one for regular employees, another for defense plant employees.

After one year, any laid-off employee who has put in one or more years of service will be paid, from the specific trust fund, a weekly supplement to his state unemployment compensation (provided the law in his state permits).

This supplement to the state compensation will be sufficient to bring the unemployed worker's income up to 65% of his normal weekly after-tax wages—insofar as this is enabled by an addition in the range up to $25 (maximum).

Starting after one week of unemployment (and provided the fund has reached 50% of the maximum requirement), this level of compensation will be maintained for four consecutive weeks (not to exceed a total of eight weeks in any year). Thereafter, the supplement will be lowered to meet a 60% level and thus may be continued for 26 weeks.

To become eligible an employee must acquire adequate "credit units" for weeks actually worked. For the number of weekly payments he will receive will depend on his backlog of the credits since he must surrender these units to receive the benefits.

It is further noted that the number of credit units required to receive a weekly benefit payment may vary according to the status of the trust fund at the time.

The plan now provides that if an employee works only 32 hr. in a week he will be given credit for having worked a full 40-hr. week in computing his credit-unit eligibility.

When the company has paid into the fund amounts

sufficient to reach the "maximum funding account level" (approximately $55 million), the company is no longer required to pay into the fund, except to restore assets to the required level in the event of withdrawals.

Once the system is operative, the amount of cash money of a weekly benefit will not normally be affected by the trust fund position. However, should the fund fall under 13% of the maximum level, there would be a 20% reduction in the benefit. And should it go below 4% no benefit would be paid until a status above that percentage had again been established.

One of the most significant clauses states that before the plan becomes effective rulings must be obtained that simultaneous payment of planned benefits shall not reduce or eliminate state unemployment benefits in states in which the company has two-thirds of its employees.

If appropriate rulings are not obtained from home states of two-thirds of the employees before June 1, 1957, the plan will terminate as of that day.

More details: The plan will not go into effect until the company has received favorable rulings (1) recognizing the company's contributions as deductible expenses for Federal income tax purposes, (2) affirming that such contributions are to be excluded in computations under the Fair Labor Standards Act, and (3) assuring that such contributions relative to defense employees are allowable cost in connection with the Government contract or subcontract upon which they are employed.

Differing Slant

While it is believed that a great number of new union contracts may tend to demand such company-paid supplements (probably labeled GAW), the actual coming effect in the food industry remains a speculation.

Counted as an asset by many is the fact that GAW appears to be impelling serious and sustained efforts to stabilize production, sales, and employment.

Presumed to be a national liability, however, is the fact that the resultant higher labor charges, whether paid off as wage increases, compensation supplement, or fringes, will be passed on, through higher prices, to consumers. And many of the latter will not be enjoying the gains of labor or be counted among the direct benefactors of the aforesaid stabilization.

One food company executive interviewed told how labor in his concern has been reduced to such an extent that it now only constitutes a small percent of operating

4 QUOTES FROM

Meat Packer

15 Yr. of Real GAW

"Our business, because of its nature, is seasonal. We cannot control the volume of raw material because we cannot ask the farmers to bring the livestock in when we are ready to kill it."

"But in Mr. Hormel's mind the idea of steady employment had to be worked out in some manner, so in 1931, using two departments as an experiment, an annual wage plan was started—a security plan for our employees in the form of an annual wage guarantee.

Then on Dec. 6, 1940, we negotiated a new union contract, and we have continued with that contract without material change since. In other words, the same union contract has been in effect for about 15 years.

"All of our 4,000 employees are paid on a weekly basis, and they are guaranteed 52 weeks' notice before they are laid off, which *assures each and every one of them a steady job for a year from the date of notice.*

"In fact, as yet we have never given notice to any of our employees, except those of a small Spam canning plant in St. Louis, which we were forced to discontinue.

"The hourly rate of pay, from which the weekly rate is computed, is established by a comparison of rates being paid for similar work in the area.

"Our employees can work 53 hr., without overtime pay unless 10 hr. is exceeded in any one day, whereupon the penalties became effective, but only after 48 hr. in that week. Double time is paid for work that must be scheduled on Sundays and holidays.

"When an employee earns time-and-a-half, we pay only the half, crediting the whole hours to the 2,080 hr. for the year. Likewise for Sunday time. If the employee earns double time, we pay 1 hr's time and credit the remaining hour to the yearly hours.

"The application of an annual wage in a plant requires a good deal of planning. When contracting on a yearly basis to pay employees not less than the law requires, then to remain economically sound, one must plan to supply them with enough work to use up the hours for which one pays.

"The sales department must consult with the plant management before starting a campaign; the traffic department must realize the plant's problems before it makes commitments; and we must keep close check on the livestock population of the U. S., since that is the source of our raw material.

"In fact, the planning and operation of the whole plan must be built around the available hours and personnel available, because on an annual wage basis one does not go out and hire *temporary* help. Every person, from his first day of employment, is on the *annual wage*, and is, therefore, guaranteed 52 weeks of employment."—From a spokesman for Geo. A. Hormel & Co.

Tea & Spice House

Opposes Coercive Way

"Although our company has never had a formal guaranteed wage plan, we have made every effort to assure steady work for our employees.

"As early as 1935, after the adoption of 'multiple management' in 1932, we endeavored to schedule production in such a manner as to assure stabilizing employment for no less than 90% of all regular personnel, both salaried and hourly, at our Baltimore plant.

"Since that time we have been able to carry out this program. We have been able, in fact, to provide 52 weeks of employment for all regular employees, counting allowance for paid vacation and paid holidays.

"In the few instances where individuals have been temporarily laid off, a termination allowance has been granted. We do employ a very few persons each year on a strictly temporary basis, but those so employed understand and in most cases are persons prefering the temporary.

"In effect, then, even though we do not guarantee employment, we have been able to provide as stable an employment situation as if we had a formal plan.

"If a guaranteed annual wage were adopted generally by business throughout the country, it would really not affect our operations at all. We would wish, in this event, also to adopt some form of guaranteed plan which, in effect, would be no different from what we now assure.

"When we express some reservations about guaranteeing wages, it is not in reference to the principle of providing work stability, but in reference to an attempt to provide stability by arbitrary legislation or by coercion.

"There can be no legislation of the life, wealth, and happiness of men. Neither can we legislate man's productiveness on which profits depend and, in turn, on which stability of employment ultimately depends.

"We believe that management should take the initiative in doing what it can to provide a better living for all employees. Job and wage security represent only one aspect, though it be a very important aspect, of the total picture.

"Although we do not believe that employment or wages can or should be guaranteed, with the implication that wages would be paid whether they are earned or not, we do believe that management has a real responsibility for

costs. This official accordingly contended that his organization could withstand a heavy increase in labor costs probably as well as any food manufacturing company.

Called Excessive Minority Power

He stated, nevertheless, that he resented the developments in the auto industry whereby a union and two manufacturers presume to force state governments to change established laws that affect all citizens.

He termed this strong evidence of a trend toward concentration of too great influence and power in very small minorities.

Another executive representing a company in a marginal branch of the food industry aptly expressed the viewpoint of many others. He predicted labor's demands on his and similar branches of the industry would result in "automation and mergers and closed plants."

It is generally recognized that if the concessions are granted in proportion to the concessions secured from the auto companies, the cost to most food manufacturers can only be met by a rise in food prices.

At least a few of the food manufacturing branches say they cannot presently add enough to the delicately-balanced price of their products to cover such increased cost of production without pricing the foods out of the market.

True, some of the concerns may mechanize further to reduce labor costs. But others claim to have already reached the limit of profitable mechanization. In either case, combining with competitors might be favorable.

Mergers have recently been progressing at an accelerated rate. The idea is not new, however, because the reasons for combining have remained much the same—lowered overhead, consolidated sales and distribution, increased output per unit of labor, and sometimes diversification.

Of course, the more strengthened the competition in a field or area, the more difficult is survival for those remaining—meaning those too small or otherwise having too little to offer in such moves.

Product Stabilization Needed

Food industry men agree that stabilized production would be a profitable goal. A few even hold that savings thus effected might offset costs of setting up wage guarantees or unemployment supplement funds.

Processors working with perishable products or seasonally

(Turn page)

QUERIED LEADERS

providing steady employment for those who wish it and deserve it. Our policy is to assume this responsibility *of our own volition* without formal guarantees as such.

"Good employee relations, good employee morale, management responsibility, and such things, are matters which cannot be legislated and cannot be forced either on management or on employees.

"The whole philosophy of multiple management is based on the principle that business should be a joint enterprise and that all parties participating in it—management, employees, stockholders—should share in its benefits.

"On the basis of this principle we have never been confronted with the issue of being forced to guarantee anything. We are not sure what our position would be if we were. But we are sure of this: That we will continue to consider our responsibility as that of a trusteeship, and will continue to do everything in our power to see that all members of our partnership derive the maximum benefits from it."—Charles P. McCormick, McCormick Co.

Shortening Maker

Decades of Job Guarantee

"*A guaranteed job is entirely different from a guaranteed wage.*

"We at Procter & Gamble Co. guarantee a workman 48 weeks of work at some job, and we guarantee those 48 weeks only after a man has been with us two years.

"The guarantee does not start the day he enters the business. So, of course, we have a leeway, first of 4 weeks out of 52. And then we have a further safeguard in that a percentage of employees have worked less than 2 yr.

"There is nothing fixed about our 48 weeks' guarantee. Some businesses might lend themselves to 50 weeks or 44 weeks, to 40 or even 36 weeks a year. No one, in my judgment, can establish a fixed formula for all kinds of industry, and that isn't too important. The important thing is for each employer of labor to make the effort to run his business steadily.

"If your experience were to follow ours, with time you would find employees working the year 'round, and you would find your production costs very stable, while in many cases they might even be lowered. Further, you would find satisfaction in having labor willing to work with you. And with other factors properly taken care of, chances are you could find yourself with a more flourishing business.

"If we were running our business today as we did 30 yr. ago, before guaranteed employment, it would cost us at least one-third more plant investment than we have today. To us, that would mean over $100,000,000.

"You can readily understand why this would be so: When operating steadily, you use your equipment constantly and use from 90% to 100% of it. There are no idle machines. Whereas, if you follow the ups and downs and wide swings of operation, you require at least 30% more equipment when the plant is going full and you are over-producing the 'consumption line.' Then you must fall back to 70% or 60% of maximum plant capacity while consumption catches up with overproduction.

"All of this adds up to an increased cost of manufacturing each unit because you failed to get the most out of the plant equipment available.

"In order to answer the question: 'Is guaranteed employment a good business policy?', I wish to cite my conclusions and then attempt to explain how I have arrived at them.

1. Steady employment, if attained, is economical in the administration of the business.

2. Labor relations are vastly improved.

3. Management will be forced to know the company's business better.

4. A 'Must': The chief officer of the company must take charge.

5. Primary manufacturers can do little unless we, the users of primary products, regulate our usage.

6. I doubt that any legislation could accomplish a satisfactory guaranteed employment plan.

"Labor relations are vastly improved by guaranteed employment. When the worker knows he has a regular and a steady job, he becomes a better man.

With steady employment, good people will gravitate to you as surely as water runs downhill, and a higher type workman, with seasoned experience, will certainly mean a more efficient workman.

"You will have a steady working force, a trained crew for every job, and there will be a minimum number of new people coming in for expensive training on the job. The man with a steady job has an attitude in the plant which is entirely different from that of the man who doesn't know if he'll be working next week or next month.

"Furthermore, the steady worker becomes a better member of the community: He assumes the responsibility of a citizen, and in time he owns his own home. And no one will ever doubt that the home owner is the more substantial and solid citizen and employee.

"Guaranteeing employment forces management to know the business better, and anything that does that is going to improve the operation. It doesn't take a very wise man to know you cannot steadily ship more than is consumed. You may do it for a short period, but then will come the period of adjustment which, of course, means slowing down production in the plant.

"Wit's this plan, you must know your consumption line,

Continued →

restricted production did not share this view. They pointed out that the majority of workers in seasonal item plants are not interested in working more than the conventional-run periods and would not consider an offer of year-'round employment to be an inducement.

Managements of several plants where big seasonal runs pile up on top of regular production have experienced difficulty when trying to retain some of their peak-season workers as employees on the standard production force.

Whichever way your own company looks upon the auto-industry contracts, the results of those negotiations will inevitably affect your company's future.

Hints for Your Planning

Here's a summary of the thinking of a number of food plant executives that may help you in shaping labor relations policies for tomorrow.

Throughout industry, labor's demands will be strong during the next twelve months and perhaps longer. And some granting of these demands seems likely. This means added costs that must be passed to consumers, and it is inflationary.

Incomes of wage-earner will be increased, in contrast to those of others. As one result, the labor force will provide, year by year, a greater market for your food products. This will be a spur to quality as well as volume.

A guaranteed annual wage—FITD-type supplement to state unemployment compensation—is most likely to be demanded at your next bargaining. So it will pay to use what time remains to prepare for negotiating.

Charts and tables depicting the facts about your business through the years should be prepared, with the tabulations covering markets, competition, cycles, production and sales fluctuations, etc.

Prime aim here is to know, before negotiating, exactly what can be done and what cannot be done.

Above all, study thoroughly the auto-company contracts. Be sure your contract is equally *limited*.

In the interim, its vital to examine your operations for ways to stabilize employment and, yes, means to minimize labor requirements. Plan to mechanize as soon as possible, to the extent profitable.

True, you may have no desire to merge. Nevertheless, anticipate the possible combinations of some of your strong competitors and estimate the consequences. For it seems probable that the trend will continue toward more large food organizations and not so many small ones.

Quotes From Leaders (Cont'd)

your consumption trends, your percentage of the available business, and the inventory of your customers. In our case, the inventory of our customer's customers (meaning the housewife who buys from the grocery store), is an additional requirement.

"You don't fool yourself when, in some shipping period, your salesmen tell you that you have increased your business 10% whereas you know from data received from dealers and consumers that their inventories have gone up 9%. You know for a fact that you have gained only 1% rather than 10%. Your production rate then becomes very clear.

"If we, as manufacturers' are going to produce steadily, we must not produce to suit a buying speed. We must have, as our guide, the consumption line, and not allow ourselves to enthusiastically over-produce because everyone is buying and goods are lying on the shelves of the dealer, of the consumer, in warehouses, or in other places. This, in turn, calls for control of the shipping rate.

"We don't hesitate to let our customers buy from us ahead of time, within reason. But this does not mean that we will ship two months' business to him in one month. We keep our shipping line full to protect our trade, or better said, to cover consumption needs, because we pretty definitely know what consumption of soaps and shortenings will be. That knowledge guides us, and it is the kind that should guide any business if it can be ascertained.

"My fourth conclusion, which I accent as a *Must*, is that the chief officer of the company must take charge of stabilizing employment and production through this plan.

"No one else is able to analyze and properly control the opinions, the optimism, the beliefs, etc., of the sales department or advertising or promotion departments, except the chief officer. He must be very familiar with the whole picture of the business so that he does not allow the company to step out and produce a plus amount of goods that is definitely beyond the consumption line and will react on the business over a very short period.

"If you have a normal consumption of 100 but, however, for two months run 120%, you know you are going to have to produce at 80% for two other months. Now, look at the variation of employment when you change from 120% to 80%, not to mention the idle machines. Having the responsibility for making such a plan work is not an easy administrative job, but when you know it is good for a business, you have to take charge no matter what pressures are brought to bear by various departments.

"Through the years, this idea of steady employment, of a guaranteed job, has run into trouble because so many of our large industries are primary industries. I am frank to admit, and have always so admitted, that it is most difficult, if not impossible, for the primary producers to have steady employment themselves unless we, the end-users of their products will regulate our production. I have in mind, of course, the steel, coal, lumber, and building industries. I am not claiming they cannot do something about this subject, but they can't do too much unless we take their products fairly evenly.

"My final point was that I doubted that any legislation could accomplish a satisfactory guaranteed employment plan. I am willing to admit that there are some countries in this world that have placed laws upon their books that, in effect, guarantee a job to workmen. A number of our South American countries do this. It makes operation in them very difficult.

"Freedom of action on the part of the manufacturer is almost nullified, and the result is inefficient production, a strained relationship, and usually a bad general condition in the plant.

"I have a notion a number of those countries will change their laws, because they are not really good for their own people and are certainly harmful to the general economy. It is without a doubt a far superior plan when the manufacturer himself can work out a procedure of steady employment through believing in the efficacy of such an operation.

"When we first started guaranteed employment, it took us at least three years to work out the plan and to operate under it without guaranteeing anything.

"In other words, we had to demonstrate to ourselves that it was possible.

"Once we found we could handle it, we realized it was a sensible operation and now, after a long period of years, *I couldn't conceive giving it up*.

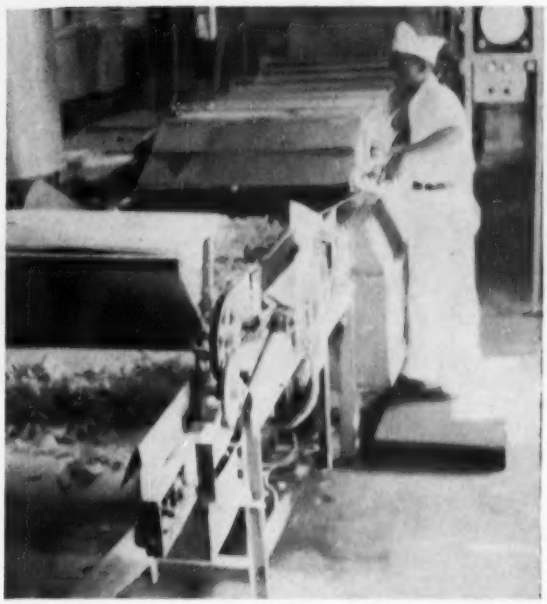
"Of course, it has some disadvantages. But in my judgment they are minor compared with the advantages. What I strongly advocate for the good of the business, for the efficient operation of it, and for the knowledge one is forced to have in order to accomplish this, is that each one give careful consideration to the subject.—R. R. Deukree, Chairman, Procter & Gamble Co.

Equipment Maker

Urges the Voluntary

"Either we cope *now*, as practical leaders of private enterprise, with such problems as the stabilization of employment at a high level; the better integration and fairer upgrading of minority groups; the securing of greater participation in, and understanding of, our businesses by employees; more employee stock ownership and sharing in business progress; and the development of more privately insured security—*or we will later cope with these problems as followers of government.*"—W. H. Wheeler, Jr., President, Pitney-Bowes, Inc.

NEW APPROACH to temperature control of continuous cooker is made with this dual pneumatic instrument. It controls rate at which potato slices are fed into fryer and speed at which they move through fryer.



CAPACITY of chip cookers at Buckeye Foods is increased by new control system. In addition, chip quality is improved, oil is kept in good condition, and one unskilled operator can handle cooker.

Varying Product Flow Licks Time Lag in

New-Way Cooker Control

Speed of conveyor feeding potato slices to chip fryer—and of rake which moves them through hot oil—regulated by dual pneumatic recorder-controller

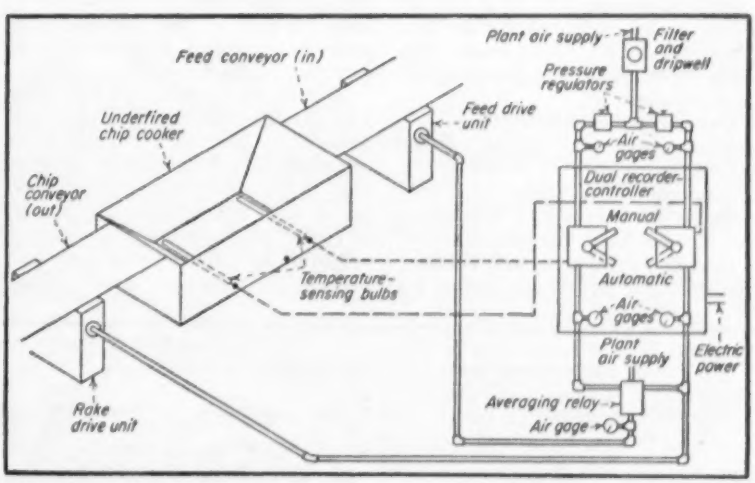
FRANK K. LAWLER
Editor, "Food Engineering"

Push more product through a continuous cooker and the temperature drops. Reduce volume of product flow, and the temperature rises. Move the product through the cooker faster or slower, and you get shorter or longer exposure to the heat, and less or more cooking.

And there you have the different approach to automatic temperature control applied to the two potato chip cookers at Buckeye Foods, Inc., Columbus, Ohio.

In this installation, the instrument engineer faced the problem posed by the tremendous heat capacity in a cooker full of frying oil. This capacity means considerable time lag in changing the temperature of the oil

(Turn to page 152)



CONTROL SYSTEM diagram shows how two averaging-type sensing bulbs at ends of cooker actuate dual pneumatic recorder-controller to vary speeds of feed conveyor and of rake that move chips into and through the hot oil.

For Top-Quality Fried Foods

Curb These 6 Trouble Factors—

- **Excessive Heat**
- **Soap and Caustic Residues**
- **Inadequate Filtering**
- **Metallic Contamination**
- **Burnt Food Particles**
- **Insufficient 'Turnover'**

W. A. QUAMMEN

Research & Development Dept., Procter & Gamble Co., Cincinnati

First off, the processor aiming for quality fried items must, of course, start with bland, stable frying fats—and these are now readily available.

But equally important is the care requisite to maintain fat quality during frying.

After continued use, any fat deteriorates, as evidenced by its tendency to darken, foam, smoke, develop poorer flavor, and produce gum on equipment.

Our company's research, therefore, was concerned with prolonging the life of frying fats by avoiding (or minimizing) these effects. Thus protected, a fat is best able to enhance the flavor of foods fried in it.

In this discussion we will consider the important factors accelerating fat breakdown, and point out specific remedies. These conditions were studied extensively in connection with potato chip production, but they apply to deep frying in general.

1—Excessive Heat

How a frying fat is degraded by prolonged heating may be measured by free fatty acid and color development. Therefore, we carried out a series of tests at two different temperature levels over a period of five days. See results Table I.

Heat speeds up color and free fatty acid development, as the frying test shows. To keep such changes at a minimum, any food should be deep fried at the lowest temperature compatible with desired color and degree of cook. Best standards for judging suitability of a fat for continued frying use are color and flavor. Free fatty acid by itself is not considered a valid measure, but it is often used in conjunction with color and flavor tests.

Another cause of fat deterioration is overheating that is localized, even though overall temperature is normal. For example, with equipment in which firing tubes pass through the fat, tubes may develop thin spots from corrosion or burning of the metal. At these points, there is rapid heat transfer from hot gasses through the tube wall. Consequently, fat in contact with these spots becomes badly overheated and may scorch or burn.

In certain types of frying equipment, the fat is maintained at temperature by circulating it through a series of tubes in a heating chamber. Normally, rate of flow is rapid, so the temperature is well controlled. But there have been instances where flow through such heating tubes was

TABLE I

Temp. (Deg. F)	Lovibond Red Color		Free Fatty Acid	
	Control (No Frying)	After 5 Days' Frying	Control (No Frying)	After 5 Days' Frying
350	4.1	37.2	.05	.22
385	4.1	123.0	.05	.36

TABLE II

Metal Added*	Fresh Fat		After 4 1/2 Hr. Frying	
	Lovibond Red Color	Free Fatty Acid	Lovibond Red Color	Free Fatty Acid
Control (no added metal)	4.3	.05	7.5	.11
Brass disk	4.3	.05	10.9	.11
Monel disk	4.3	.05	10.3	.15
Copper disk	4.3	.05	13.4	.19

* 1 sq. cm. metal/16g. fat

TABLE III

Kettle	Kettle Treatment	5th Day Frying Lovibond Red Color
No. 1	Alkali washed, Proper rinse	18.0
No. 2	Alkali washed, No rinse	41.0

so slow (due to obstructions) that there was trouble. Such intense overheating resulted that some of the fat charred and coated the inner surface of the tubes.

This led to progressive fat deterioration, which eventually was reflected in the keeping quality of the product.

2—Metallic Contamination

Some metals have pronounced prooxidant qualities toward fat. For this reason contamination of frying fat with metals—particularly copper and some alloys containing copper—can accelerate fat deterioration. Refiners of high quality hydrogenated fats or oils are careful to prevent any contact with copper during processing.

To gage the effect of copper on fat and on potato chips produced in the fat, we ran controlled frying experiments. Copper, brass, and Monel plates were deliberately added to the kettles. Results of these tests are shown in Table II.

As shown, both color and free fatty acid increase when fat contacts copper and Monel. In the case of brass, fat color darkens at a rapid rate, although at this stage of frying there is no effect on free fatty acid development.

3—Soap, Caustic Residues

It is good practice to drain and wash out frying equipment thoroughly at regular intervals. But this cleaning operation must also include a thorough rinsing, since traces of soap, alkali, or other cleansing agents, speed fat deterioration. (Table III).

Fat in Kettle 1, which was washed and rinsed properly, showed appreciably less darkening than that in Kettle 2, which was not rinsed free of residual alkali.

4—Burnt Food Particles

In the deep frying process, fragments of breading material and food may be left behind. These particles become scorched or burnt, and if not filtered out can cause off-flavor.

An example is one plant's recent encounter with a flavor deterioration that decidedly cut product shelf life.

Investigation revealed that the tubes preheating the fat were being clogged with burnt food particles. This carbonaceous material not only affected flavor of the fat and food, but it also was flaking off into the main body of the frying fat and peppering the food with tiny black specks.

Remedy here was cleaning of preheating tubes at weekly intervals—with a good cleansing agent instead of the plain water formerly used.

5—Inadequate Filtering

We have always urged that frying fats or oils be filtered after each day's or night's frying. However, it is essential to use a good filtering material, otherwise the filtering can have a detrimental effect on the fat.

Take, for example, the case of a large processor who had trouble with rancidity. A thorough check of every factor finally indicated that the trouble lay in trace metals in the filter earth being used. In this instance, traces of copper had contaminated the frying fat, thus hastening the oxidative reaction which produced rancidity.

6—Insufficient Turnover

During frying, fat is absorbed by fried products and thereby removed from the kettle. Fresh fat must be added to replace that absorbed. Thus, there is fat "turnover", which can be defined as the relation between the amount added over a period of time to the total amount in the kettle.

If turnover is rapid, the amount of fat which has to be thrown away is minimized. For most efficient operation, aim is a complete turnover of fat in about 10 hr. However, in some instances (such as restaurant frying), turnover tends to remain low, hence frying life is reduced and it is necessary to discard the fat regularly.

But in commercial frying operations, production rate can be established at sufficient turnover to insure that a usable quantity of fat is maintained in the kettle at all times. Under such conditions, frying becomes continuous and no fat is discarded.

A few figures will illustrate this point: Say that we have a kettle of 2,000-lb. capacity to which 1,000 lb. of fat is added daily, based on a 10-hr. frying day. Then turnover period is 20 hr., or two frying days. Now let us assume that we can do the same job with 1,000-lb. kettle. We still replace 1,000 lb. a day—but the turnover period is now only 10 hr.

There are two fundamental principles involved in correcting for low turnover: (1) Cut the amount of fat used to the minimum with which the kettle will operate, or use a smaller kettle; (2) increase the amount of food put through the kettle.

In every installation, it is best to use the smallest practical quantity of fat which will fry the amount of food required. But there should be enough fat to keep the temperature reasonably constant. With the least amount of fat, turnover is rapid and a minimum is held at frying heat.

The above article is taken from the paper "Technical Aspects of Commercial Frying," delivered by the author before the Great Lakes Section of the Institute of Food Technologists in Detroit.

• • •

Dr Pepper's Cans

—Continued from page 54

Main disadvantage to cans is *price*. This begins with the package itself and involves canning and shipping costs. Product and production labor costs are essentially the same with both packages.

Distribution costs are cut a little, due to the fact that the can is a one-way package and does not involve handling of pickups and time spent in refunds. The dealer likes this advantage, but mainly he likes both packages, which give the consumer a choice. With the return bottle, the retailer gets the customer back in the store again, and this fact is not to be overlooked.

According to President Green, a one-way container will eventually account for 35-40% of all soft drink sales. He points out that the beer field has experienced such a shift in the last 20 yr.

Optimistically, he adds: "Maybe we soft-drink operators will be able to get there much faster than that."

End (Resume reading on page 55)

Waxing Frozen Meats

—Continued from page 51

the dipping tank. An open control panel on the side of the machine allows close temperature regulation of the wax in the machine.

The cooling conveyor carries the meats to the packing station, where they are placed in shipping cartons by two women. Cartons then go to freezer storage.

The wax is micro-crystalline and similar to that used for coating cheese and also cartons for frozen foods and milk. It was developed by L. Sonneborn Sons, Inc., New York City.

Made with a petroleum base, this wax has a high melting point—140 deg. F. It is transparent enough for the customer to read the label through it. Further, it will withstand rugged supermarket handling.

End (Resume reading on page 52)

Packets of moisture- and vapor-proof film, heat sealed and filled with nitrogen, enable direct movement of product to store and pantry shelf without old need of refrigeration . . . Keeps 6 months

Improved Packaging Extends Life of Dry Yeast

IMPROVEMENTS in packaging techniques and materials are largely responsible for today's new nation-wide popularity of active dry yeast.

This product boasts a shelf life of about six months at room temperatures.

Comparing this with the mere few weeks under refrigeration for the highly perishable compressed yeast cakes, the great advantages to manufacturers, distributors, retailers, and housewives are manifest.

Units of active dry yeast are flat laminated film packets or envelopes, about 3 in. square, containing 7½g.* This package is compact, light in weight, easy to open, and provides adequate mechanical protection for the contents. It is impervious to water vapor and is gas tight.

Active dry yeast ideally contains only about 8% water, and at such a level is quite stable. But if exposed to humid conditions found in many sections of the U. S., it rapidly takes up water and starts to lose leavening power.

Furthermore, keeping the product out of contact with the oxygen prolongs its useful life. During World War II, active dry yeast supplied to the armed forces was vacuum packed in 1-lb. metal cans. But this proved unsatisfactory with flexible packets, because the vacuum caused the sides to collapse and press inward on the contents.

Result was adherence of the yeast to the inner walls of the packet, thus making emptying difficult. This led to development of packaging under the inert gas, nitrogen, at atmospheric pressures.

The Special Film

Various types of laminated materials may be designed to be impervious to water vapor and gas, and to have an inner heat-sealing surface. Generally speaking, a film with at least four laminations is needed for this type of package.

An example is a film comprised of: (1) An outer surface of aluminum foil approximately 0.00035 in. thick, attached with a starch adhesive to (2) glassine paper, thermoplastically attached with a rubber base adhesive to (3) another layer of aluminum foil the same thickness as (1), attached with a rubber base adhesive to (4) Pliofilm.

This inner surface makes possible heat sealing. For this type of plastic will unite with another surface of the same material when subjected to heat and pressure.

A number of different machines are available for packaging products in flat envelopes at speeds of 60 or more per minute. Some use two separate webs of packing film, one printed with the front design, the other with the back.

Others use a single web with both front and back printed side by side. With this latter arrangement the web is folded at the center as it enters the machine, to bring front and back into position.

First operation, as the web of film unwinds from the spool and enters the machine, is imprinting an expiration date on each packet. This date is ordinarily about six months later than the packaging date, in keeping with the product's usual shelf life.

Since the date fits tightly into the space provided for it, the machine must be kept in exact adjustment. Furthermore, the impact of the stamp must be carefully adjusted to make a "kiss" impression. Too light a stroke means an illegible date, whereas one that is too heavy may injure the film and cause it to leak.

Then front and back of package are brought into position with the Pliofilm sides facing one another. In the machine using a single web folded down the middle, no adjustment problem is involved. With the one that uses separate webs, positioning must be carefully done to make sure that fronts and backs are exactly opposite one another.

Packets are then formed and filled in the following manner:

* The 7½g. fill was originated to produce baking results equivalent to one of the old-fashioned compressed yeast cakes, since many of the recipes used by housewives today were designed for compressed yeast.

1. Bottom and sides are heat sealed, forming a sack with an open top.
2. Charge of yeast is dropped into the packet, and at the same time it is filled with nitrogen.
3. Top is heat sealed, and
4. Packet is sheared from web.

Pliofilm Heat Sealed

Sealing is effected instantaneously by electrically heated metal dies, having either waffle design or flat surfaces, that come together and pinch the outer ¼ in. of the packet. The dies are maintained at approximately 300 F. temperature. However, higher or lower temperatures may be required, depending on exact time of dwell with the dies closed, according to the speed at which the machine operates.

Although die temperature is thermostatically controlled, it is also registered on an easily read thermometer in full view of the machine operator.

Because of its granular nature, the yeast flows freely by gravity from large transparent plastic hoppers above the packaging machines. The charge for each packet is measured volumetrically, not by weight. Nevertheless it is possible to control the fill at 7½g. plus or minus 0.2g.

Only hazard here is that different lots of yeast may vary significantly in bulk. To guard against this, fill is checked, by means of a sensitive balance, every time a new lot of yeast is started. Volume is easily regulated by a manually operated screw that raises or lowers the bottom of the measuring pocket.

Gassing the Pack

The yeast within the packets is surrounded with nitrogen by a surprisingly simple procedure. Gas is supplied to the packaging machines at approximately 10 psi. from high pressure tanks. At each machine is a needle valve to regulate the flow of gas, along with a portable meter to indicate rate of flow—approximately 35 cu. ft./hr. is used.

When properly adjusted by the responsible supervisor, handles of valves are removed to prevent tampering by machine operators or other unauthorized personnel.

Nitrogen line terminates at the top of a filling spout, through which each charge of yeast falls into a packet. End of the line is fitted with baffles so that turbulence resulting from the gas flow will not divert flow of yeast.

With this simple arrangement, and with the pressure and rate of flow approximately as indicated, filling spouts, yeast stream, and entire field where packets are formed and filled are kept saturated with nitrogen. There is necessarily some wastage, but this gas is nontoxic and odorless, and the cost is inconsequential.

Two safeguards help assure correct operation of the nitrogen pack equipment:

At the cylinders is an alarm set to ring a loud bell when the pressure drops below 10 psi. This signals the supervisor to stop the machines until fresh cylinders are put in place.

Second, there is an automatic oxygen meter in the nitrogen line near the machines. It operates on a principle related to the paramagnetic properties of oxygen. Meter, read periodically by the supervisor, informs when the nitrogen is contaminated with oxygen.

As completed packets are cut from the web, they fall onto a belt conveyor and are moved to an operator who counts them into cardboard display cartons. These are packed into shipping cartons made of 200-lb. test regular-slotted corrugated board. To facilitate rotation of stocks in warehouses and stores, both display and shipping cartons are hand stamped with expiration dates.

Control of Quality

At the packaging line, quality control is maintained in three ways:

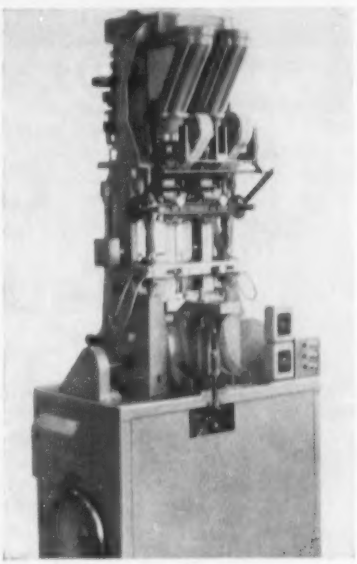
1. Continuous visual inspection for correct positioning of front and back sections and correct positioning and legibility of expiration date.

2. Periodic checks of net weight, employing a sensitive balance reading to tenths of a gram. Here, the label does not state net weight (it is less than ½ oz., and there is no legal requirement for such a label designation). However, this weight must be precisely controlled because the amount of yeast per packet influences the results the housewife obtains.

3. Periodic tests of sealing efficiency and soundness of the film by means of a simple leaker test. A water-filled desiccator jar is connected to a vacuum pump. Packets to be tested are held below the surface of the water by attaching them to the desiccator plate with rubber bands. The jar is closed and a vacuum is drawn. Leaks in packets, whether at the seams or at defects in the packaging film, show up as streams of bubbles.

In the plant laboratory, more elaborate tests may be conducted. An essential check is for presence of oxy-

(Turn to page 198)



FILLERS, similar to this Stokeswrap machine, form packets from printed laminated film, add 7½g. dry yeast and nitrogen, crimp and heat-seal all four edges at speeds of 60+ per min. Stokes & Smith photo.

PACKAGING FILM comes in two types: A single web (above) with both front and back printed side by side, and separate webs (not shown) one printed with front design, other with back.

SIGNIFICANT FINDINGS came out of dynamic AACC talks—42 in all—that drew "full houses" of cereal scientists.

Cereal Chemists Tackle Salient Topics

Pointed talks detail new nuclear moisture check . . . ¶ Chances of milling more wheat from grains . . . ¶ Testing for extraneous matter . . . ¶ Freezing bread . . . ¶ Effect of two new chemicals on dough mixing . . . ¶ Varied results on prepared cake mixes . . . ¶ And performance of Britain's advanced flour-color grader

FE STAFF

Nuclear-physics potentials, higher milling yields, and frozen breads were highlight subjects at the recent 40th annual meeting of the American Assn. of Cereal Chemists in St. Louis.

Further cardinal talks before the audience of nearly 500 scientists concerned a long-sought test for rodent urine in grains, needed research on testing grains for insects, and the influence of two separate chemicals—water-soluble pentosans and calcium stearyl 2-lactylate—on dough-mixing time. Another topic: Cake mixes.

Nuclear Magnetic Resonance

A method of determining cereal-product moisture in less than 1 min. —instead of the 1-5 hr. of routine methods—was reported by John P. O'Meara, Southwest Research Institute, San Antonio.

It is based on magnetic properties of hydrogen atoms in water. Under certain conditions, these atoms absorb radiofrequency energy, and the gage of the amount in a sample gives its water content.

Great need for a key moisture gage of wet-weight-basis products led to the current effort to develop equipment suitable for rapid and accurate checks on such products as starch, starch derivatives, and other byproducts of the corn wet-milling field.

In practice, the test sample is sealed in a nonmetallic container, which is inserted in a coil mounted between poles of a large magnet. An oscillator then supplies a radio-type signal which is absorbed by the sample, then detected and recorded.

In measurements by this NMR (Nuclear Magnetic Resonance) apparatus, the sample does not come in direct contact with the detecting portion of the instrument, and so the checks can be made repeatedly on sealed samples.

The method has been applied to commercial starches and starch derivatives (3 to 20% water content) and to starch suspensions. It distinguishes between "free" and "bound" water, therefore checks water-sorption properties of hygroscopic solids.

Two of the meters already have been delivered to wet corn millers for routine analytical use.

Meanwhile, there is plenty of evidence that this technique can be far more than just an analytical tool.

The Institute has investigated the idea of using the resulting signal for automatically controlling dryers and blenders.

On a commercial level, such nuclear resonance instrumentation might be employed for continuous classifying of grain on a moisture basis, also to inspect packaged dehydrated foods.

And it has potentials for checking

on interaction of solids and liquids, such as in mixing of foods, preparation of doughs, and changes in foods during freezing and storing.

As for disadvantages, Mr. O'Meara pointed out that cost of the equipment is high and further that units are not openly available at this time. In addition, the instrument requires skilled electronic technicians.

The method, in its present form, is not applicable to materials with variable fat contents.

Greater Milling Yield

More flour from each wheat kernel may be one long-range result of work being carried out by E. F. Seeborg, Washington Wheat Quality Laboratory, Pullman.

Millers recover only 70 to 75% of the flour-forming endosperm that makes up 85% of each wheat kernel. The wheat kernel simply does not permit milling out more.

Mr. Seeborg explained that cell-wall thickness and amount of pentosans affect the quantity of flour a miller gets from a variety of wheat. Thicker walls make it more difficult to recover the endosperm, with the toughest cell walls found near the crease in the kernel. Too, this area has the most pentosans, which also make the wheat tougher.

Biologists should, he said, be able to breed wheats specifically for milling quality, using varieties that mill well.

It is easy for them to breed into wheats the usual characteristics they can see—straw height and strength, hardiness, resistance to insects and disease, etc.

Milling quality, however, is the big question mark until there is enough seed available for a milling and baking test.

This takes close to five years of growing a variety and, meanwhile, thousands of sister selections must be discarded. So there is a lot of selection for these other characteristics long before anyone can test milling and baking quality.

To lick this time lag, chemists and engineers have worked together at Washington State College to perfect a micro-mill that indicates the milling quality of a wheat from about a thimbleful (5g.) of wheat. That's less wheat than comes from one plant.

This allows agronomists to check milling quality of new wheat crosses as they check them for other desirable traits. Varieties that don't mill well can be thrown out at that point instead of four years later, as before.

This milling process leaves only 2 to 3g. of a flour. However, USDA chemists are working on a micro-test for indicating how the flour from a wheat will bake, using that tiny amount.

Potential 10 to 15% additional flour yield is quite a challenge, Mr. Seeborg concluded.

Easy Rat-Urine Test

A new simple technique for detecting wheat contaminated with rodent urine was announced by W. F. Geddes of the University of Minnesota. It is based on a color reaction between ammonia and Nessler's reagent, with the ammonia released from urea in rodent urine by action of buffered urease.

Test is carried out by treating individual wheat kernels with a drop of 2% urease and, 10 min. later, with a drop of Nessler's reagent. Resulting color—yellow to orange—is compared with a similarly treated uncontaminated kernel.

The sensitive method detects wheat kernels in contact with rat urine diluted with 50 parts of water. Test can be made in the field as well as in the laboratory.

Pentosans Vary Mixing

P. J. Mattern, Department of Biochemistry & Nutrition, University of Nebraska, reported discovery of a factor in flour—a water-soluble pentosan—that affects dough-mixing time.

Amount of mixing of a flour to give best bread is largely determined by wheat variety. At one extreme are those wheats milling into undesirable flours with a short mixing requirement, making the flour sensitive to under- or over-mixing. At the other are those giving flours requiring long mixing, thus slowing down bakeshop operations.

Mixing time of a short-time-mixing flour can be extended ten times or longer by extracting the pentosan fraction. This soluble fraction may be added back to the flour to produce any desired mixing time.

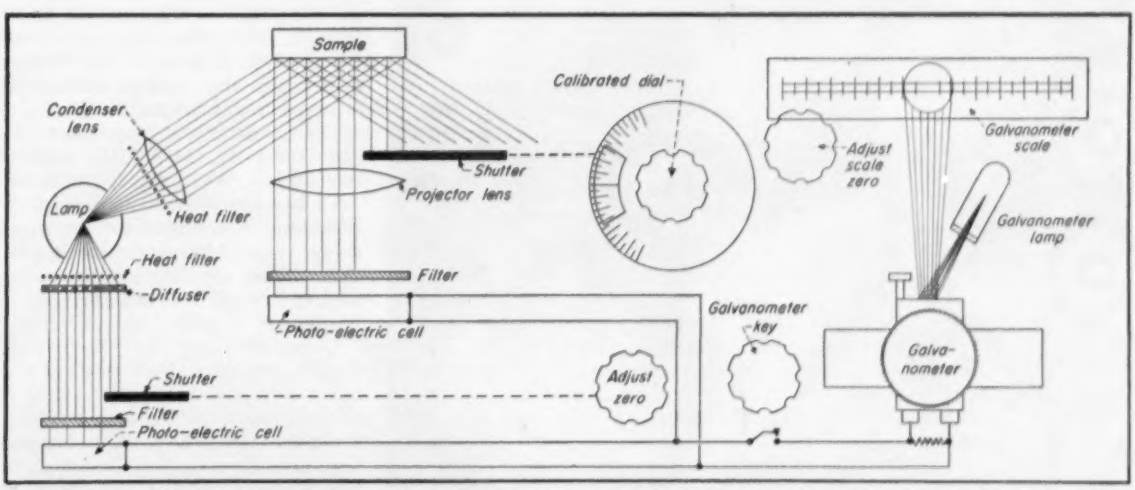
Work is now under way to turn these experiments into practical channels.

Better Frozen Breads

Contrary to popular belief, keeping properties of white bread that is frozen and then defrosted are slightly superior to those of fresh, according to J. W. Pence, Western Utilization Research Branch, USDA, Albany, Calif.

Crumbliness and firmness took place more slowly in the frozen-and-defrosted than in fresh bread, although freezing and thawing made the bread somewhat firmer at the start of keeping quality comparisons.

With proper commercial freezing,



OPERATION of Britain's Kent-Jones & Martin Flour Color Grader is disclosed in this schematic. D. W. Kent-Jones, well-known English chemist, told how use of this instrument has superseded the ash test in his country.

bread need carry no shelf-life penalty.

A primary objective in freezing bread commercially is to arrest staling, including rapid development of crumbliness and firmness in the crumb. Freezing and defrosting increase these traits—the extent depending upon the speed the bread is frozen and defrosted.

Therefore, critical evaluation of the practical value of this freezing requires knowledge of how fast unfrozen bread becomes firm under conventional handling. For best results, bread should be frozen rapidly—as soon after baking as possible.

Freshly baked, wrapped bread, for example, froze in about 1½ hr. in a −20 deg. F. freezer. It completely defrosted in 4 to 5 hr. at room temperature (about 74 F.). The bread increased in firmness about the same amount as fresh bread held 24 hr. at 74 F. But after the second day of defrosting, the originally frozen bread was still as fresh as the 2-day old fresh baked bread, as judged by firmness and crumbliness.

Thereafter, originally frozen bread remained slightly fresher than the fresh loaf during six days' storage.

Advantage of freezing bread is to permit it to be stored for days or even weeks before defrosting.

Checking Kernel Infestation

Regarding the X-ray technique of directly viewing contents of each individual grain kernel for internal infestation, R. S. Roe, Associate Commissioner of Food & Drugs, Department of Health, Education and Welfare, expressed disappointment that there has not been more headway.

This method, he said, may prove to be the most accurate.

It is true, he continued, that for some operations, initial outlay for equipment is high, trained personnel to run the test not available, and elapsed time required for a determination too long.

Nevertheless, it would seem to offer great possibility for use by mills having control laboratories, also for Federal and State grain-grading laboratories, and for consulting firms.

Meat vs. Vegetable Shortenings

No differences were found in stability or baking performance of prepared cake and biscuit mixes with vegetable oil and certain meat fat shortenings over a 10-week test-study period, according to G. T. Carlin, Swift & Co., Chicago.

A second study was made to compare the stability of monoglycerides used in both shortenings. Different mixtures with each type of fat were made with flour at three moisture levels, giving a total of six batches. Portions of each batch were stored at 45, 100, and 145 deg. F. Samples analyzed for fat breakdown over the 10-weeks revealed no differences between mixes prepared with animal and vegetable fats.

Tolerance to over- and under-mixing can be increased by adding calcium stearyl-2 lactylate to doughs containing 3 to 8.5% nonfat milk solids of good baking quality, reported W. G. Bechtel, American Institute of Baking.

Good quality bread was obtained when the dough was mixed 2.7 times the optimum mixing time.

This compound produced a surprisingly good loaf of bread with 8.5% nonfat milk solids of poor baking quality when doughs were given optimum mixing.

Tests on the influence of various ingredients on deterioration of white cake mixes stored at different moisture contents were discussed by L. S. Cuendet, University of Minnesota.

In general, mixes stored without baking powder were superior. Shortening rapidly deteriorated cake-baking quality whether or not baking powder was included. Low percentages of fatty acids from flour or shortening significantly enhanced rate of deterioration.

After severals weeks, the mix had a slight yellow-brown color that was not evident in those mixes made without milk powder. De-sugared egg white powder did not influence deterioration.

W. F. Schroeder, The Humko Co., Memphis, pointed out that deterioration of cake mixes is caused by interaction of intimately dispersed ingredients. As a result, certain changes must be made in the composition of the emulsifying shortening.

It is now possible to formulate special shortenings essentially inert to chemical action in such mixes. **Significant in this respect is the iodine value of free fatty acids in the monoglyceride component of the shortening.**

Fading of the brown color in stored cookies is closely related to humidity, temperature, and gaseous atmosphere, according to J. A. Johnson, Kansas State College, Manhattan.

Dextrose-containing cookies lost color darkness after 42 days at high humidity, while color changes in sucrose cookies were slight.

Decrease in color darkness was greatest when the humidity of CO_2-stored dextrose cookies was increased from 10 to 34%. There was less decrease in darkness when cookies were stored in oxygen and nitrogen.

Storage of dextrose cookies at 25 and 38 deg. C. (34% R.H.) resulted in color loss. At 70 deg. C., an initial color loss was followed by darkening.

Adding 5% dextrose to sugar cookies browned them markedly, and these cookies were more stable against oxidative rancidity than those void of browning.

BETWEEN MEETINGS, chemists "browsed" exhibits, eyed new test devices.

Easy Fat Test

According to D. C. Meek, Pillsbury Mills, Inc., Springfield, Ill., techniques have been developed to expand use of the Halowax solvent (monochloro-

(*Turn to page 177*)

". . . and when he didn't make out any sort of defense, we fired him."

Ole Sage Episode

CASE OF THE MISSING TOOLS

A sly "lifter" among your employees? . . . These angles and aspects will help resolve the touchy problems posed

IVAN C. MILLER
Associate Editor, "Food Engineering"

Ole Sage was checking over some training-program notes when Plant Superintendent Ed Strong came in and dropped rather disconsolately into a chair.

"Seems to me," Ed opened as Ole looked up, "that we have let too many grievances reach the arbitration stage. He stoked his pipe, then continued: "That's my conclusion after noting how many times Zenith Canning Co. gets the short end of the stick in these decisions."

Ole merely nodded, and Ed went on: "There are some cases, on the other hand, that I don't think we can afford to back down on, no matter what happens."

"Well, spell it out for me," suggested Ole. "What particularly is eating you? Maybe I can help."

"It's about Clyde Klepto," said Ed. "We suspected for some time that he'd been filching tools and other things. Yet we couldn't do anything about it because we lacked hard and fast proof.

"But then more and more things were missed from his department. And though no one actually ever caught Clyde in the act, we finally clearly established that no outsiders have had access, and also that the shoe simply couldn't fit any other employee.

"So we confronted Clyde–drew the picture for him. And when he didn't make out any sort of defense, we fired him."

"But then the union immediately filed a grievance," volunteered Ole.

"Wouldn't you know it," answered Ed. "Of course, when we negotiated our contract, they went along with us about the necessity of maintaining discipline and discharging employees for cause, especially for dishonesty. But when you come right down to a specific case, they battle every last angle and point.

"Maybe they figure it's easier to let the question ride into arbitration than to hassle out the status of their member in the union hall. Anyhow, the union president says that unless we actually get Clyde Klepto indicted and convicted of the theft they won't accept his discharge."

Ole lighted his briar, then commented: "I agree with you that this is one case you shouldn't yield on. So I don't see that you have any choice but to go to arbitration, since I'm sure you don't want to prosecute."

"No, we don't want to prosecute. There's the rub," complained Ed. "While our evidence is strong, I still have to admit it's circumstantial. So I doubt if it would stand up in court.

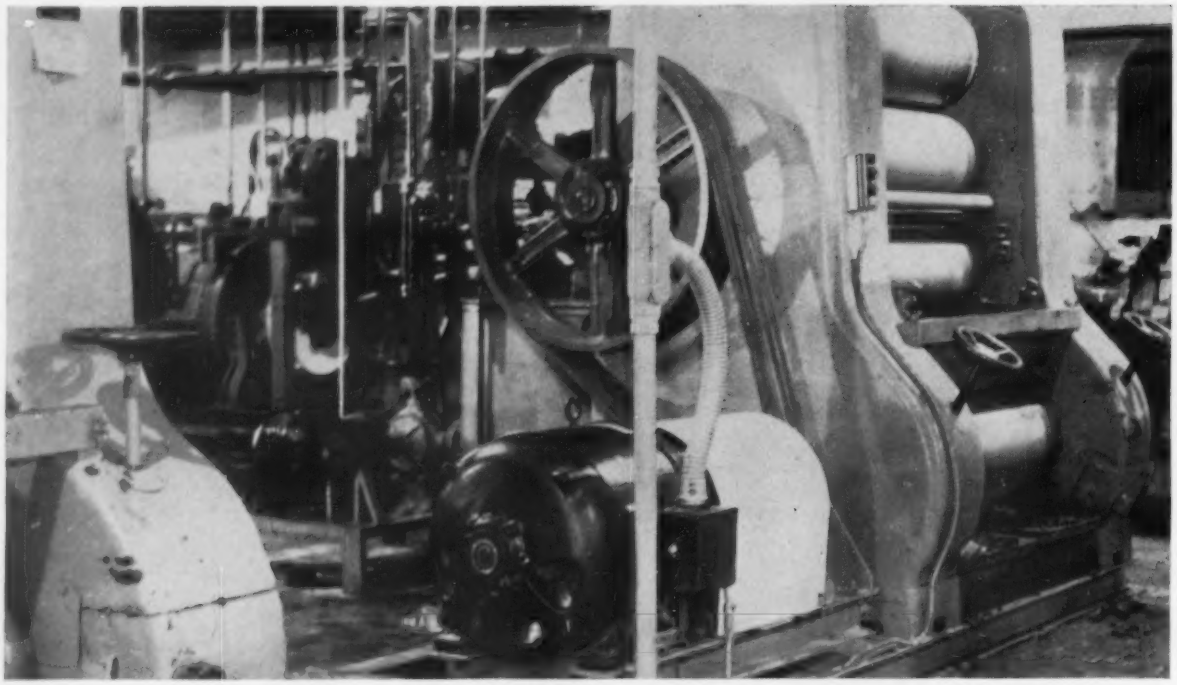
"Furthermore, I don't have to tell you that trying to send a man to jail for pilfering company tools wouldn't be too good for the company public-relations-wise. I would rather handle this thing privately."

Meet Ole Sage . . .

Up the hard way came Ole, our principal character in this special series of "cases" fictionized to pinpoint boss-worker problems in the 1955 food plant.

Ole began as a laborer, proved himself "a good worker" who "used his head"—thus won the respect of both workers and bosses. He later rose to foreman, then superintendent. And finally he was management's choice as "a natural" to head Industrial Relations, a job he carried out with unusual success until his retirement.

—Actually, his was a very short retirement. Because his old company, and others, too, quickly were calling on him for counsel—as related in these episodes.—*The Editors*



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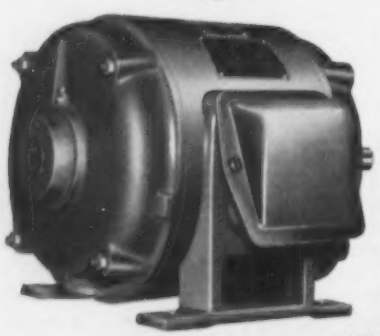

CE-29

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Ole nodded, and Strong went on: "I'd hate to make things overly tough for Klepto in the future. Maybe medicos can help him. Nevertheless, I feel Zenith has to let him go. What I'm afraid of is that an arbitrator might require the same kind of evidence as a court. Where would that leave us?"

"Well," said Ole, "I don't think you ought to assume that an arbitrator will reinstate him just because a court might not have enough evidence to put him in jail. Let the grievance go to arbitration and see what happens."

"On the Button"

Superintendent Strong took Ole's advice—carried the case to arbitration.

Then, some weeks later, he was back in Ole's office with the settlement papers.

"Got to admit it," he said. "You hit this Klepto case on the button with your slant on how arbitrators might be expected to view the angles on evidence of theft."

Ole picked up the papers and read:

"In deciding this issue, the arbitrator accepts as fundamentally sound the company's position that there is a difference between finding a man criminally guilty of stealing in a court of law and, on the other hand, having enough evidence to convince a responsible person, acting reasonably as a representative of the company, that a given employee has committed an act constituting just cause for discipline.

Before disciplining under the agreement is warranted, there must be substantial ground for believing that the offense has been committed. However, this 'substantial ground' may fall short of constituting proof adequate for conviction in a court of law, where our rights as citizens are protected by a rightfully stringent set of rules of evidence and other protections for the individual.

"An individual's right to continue to be employed by a given company is not coexistent with his rights as a citizen.

"It is correct to believe that the standards whereby an employee's honesty is judged by his employer for purposes of disciplinary action well may be somewhat different from the standards whereby his criminal guilt or innocence as an alleged thief would be judged in a court of law.

"It is the judgment of the arbitrator that the evidence offered, although of a circumstantial nature, definitely points to the conclusion that the aggrieved employee was guilty of the specific act of theft involved in this case. In the arbitrator's opinion this was sufficient grounds for the company to exercise its right of discharge under the agreement."

Ole Sage put down the award with a sigh. "Well, we won that case," he said. "But let's not be too complacent about it.

"From now on, let's try to save company money and personnel by better control of equipment. If there is less temptation around the plant, we may be able to avoid messy situations like this in the future."

Editor's Note: The settlement quoted in this episode was taken from an actual case weighed under rules of the American Arbitration Assn., with Prof. W. N. Loucks, of the University of Pennsylvania Law School, as arbitrator. Fictional names have been used here for the company and worker involved.

Particularly, readers should not infer that other arbitrators would reach the same decisions in cases apparently similar to those recounted in these episodes, since circumstances differ widely, thus altering the factors.

Rather than being based on precedent, decisions derive from specific case history, contract points, and pertinent evidence.

From Ole's Notebook

OBSERVATIONS

Product Picketing Illegal

Some unions think that a good way to put pressure on a struck employer is to enlist the aid of the public. They may, for example, set up picket lines at retail stores, urging customers not to buy the company's product.

If your firm is hit by such tactics, you may have grounds for complaining to the National Labor Relations Board. Picketing aimed at consumers is illegal, the Board says, if employees of companies not involved in the dispute refuse to cross the picket lines.

Here's how one union got in trouble: In the course of a dispute with a soft-drink bottling company, it picketed retail stores with signs asking "friends" not to buy the drink. The union told the strikers this was an appeal to the public and wasn't to be used to stop deliveries to the stores.

Nevertheless, the men picketed entrances used in common by employees, delivery men, and the public. And at least once this prevented a driver from making a delivery. Also, other deliveries were delayed until drivers checked with their employer or the union.

■ **The union's explanation didn't hold water, according to the NLRB, which called it a move intended to sever the business relationship between the soft-drink company and its customers and between those customers and their suppliers.**

Also, since neither the retail stores nor their suppliers were parties to the union's dispute with the drink firm, the picketing was held to be an illegal secondary boycott.

Picnics and Their Costs

Few employee-relations events involve more thought, planning, and exertion than the annual company picnic.

Last spring, Associated Industries of Cleveland asked a cross-section of companies in the area (considered generally representative of U. S. industry as a whole) for details on such annual outings.

This check showed that July is the month and Saturday the day of the week most frequently selected. And private groves are the top choice of site, though a surprising number of these affairs have come to be held in amusement parks.

Programs range from a modest number of contests for employees' children to elaborate affairs with games an contests for all, prize drawings for such items as television sets, deep-freeze cabinets, etc., and dancing to a well-known orchestra in the evening.

In about half the cases, employees bring their own food. But a majority of companies furnish both soft drinks and beer.

No small matter is the question of cost. Here are the survey figures: Average cost per employee for all companies is $2.43. Lowest per employee ran $1.40 (larger-personnel company); highest was $20.08 (smaller personnel). In some cases, company and union share the cost.

■ **Respondents generally agreed that the picnic provides an excellent opportunity for management and labor to get together on a family basis. Good fellowship, morale building, better identification with the company, and better understanding, are among the major benefits.** (*Turn page*)

Equally apparent is the fact that it's something that many managements like to do for their employees, and that beneath the great informality which is the trademark of these affairs lies a sincere mutual regard.

CLIPPINGS & COMMENTS

Bulletin Board Hints

As an employee communication device, the company bulletin board has a distinct job to do.

The bulletin board is needed to fill the time between editions of the company publication, as well as to carry various special types of promotional information.

■ **Any item that has been posted more than one week has about as much interest value as last month's newspaper. To maintain effectiveness, bulletin-board copy should be changed completely twice weekly, or at least some bulletins ought to be added in the middle of the week, with the complete change at the week-end.**

To make sure bulletins are posted regularly and taken down at expiration time, code each one. In addition to the posting date and the scheduled date for removal, each bulletin may carry a coded letter to control un-

authorized postings not originated by designated sources.

Bulletins should be kept short, since they're read by people standing or passing and must be understood in a minimum of time.

Splashes of color, change of production method, and variety of type size and design create renewed interest, as do photos and other illustrations.

Copy should be as personal and informative as possible. It should always support the principle that the entire company is made up of ordinary people, not of opposed groups, classes, or categories.

For this reason, every bulletin should be signed by an individual, never signatured "The Management," "The Company," or "The Personnel Department."

For the same reason, no bulletin should ever be addressed "to the workers" or "to the employees"—*Personnel News Notes, Owen-Illinois Glass Co., Inc., Toledo, Ohio*

Achievement vs. Reward

Attainment of a goal provides more satisfaction than any reward. And importance of goals is that they give people something to work for.

Reason for making goals specific is that progress toward them should be measurable. They should be attainable so that there can be recognition of achievement.

Accomplishment is its own greatest reward.—*Human Relations in Small Industry, McGraw-Hill Book Co., Inc.*

New Drying Techniques

—*Continued from page 61*

At a controlled solution density, moisture removal is proportional to solution temperature. So all that is necessary to supply air of desired dryness is to keep density and temperature of this solution constant.

Solution density is constantly maintained by cycling a steam valve in the regenerator-coil line. As the solution picks up moisture from incoming air, it becomes less dense and increases in volume.

Correspondingly, the float valve raises an integral float switch that starts regeneration of the solution by opening a steam valve. And after the solution has been regenerated to proper density, the float switch opens and shuts off the steam valve.

How Washers Operate

During the high humidity in summertime, outside air at about 95 F. dry bulb and as high as 120 gr. per lb. first passes through a filter (see diagram).

Next, filtered air is introduced to each of four washer sections of the dehumidification unit operating in parallel. Part of the filtered air goes through both of the regenerators.

In each washer, air flows countercurrent to a flood of moisture-absorbing lithium chloride solution. Simultaneously, both air and solution pass over coils through which cooling water is pumped.

Now cooled to 82 F. (D.B.) and dehumidified to 30 gr. per lb., air from the washers is forced through a series of Berl Saddle eliminators that remove any trace of lithium chloride.

Solution Regenerated

As the absorbing solution becomes saturated with moisture, a small amount is intermittently pumped into the generator section of the dehumidifying unit. In each section solution is sprayed over steam coils. Extracted moisture goes to a scavenging air stream that exhausts it to the outside. Restored to original concentration, the solution is returned to washers for further dehumidification of air.

The winter drying cycle does not require use of dehumidification equipment. Outside air at 0 to 30 F. (D.B.) and about 45 gr. per lb. passes through filters and heating coils that bring the dry bulb temperature to 80 F. Then fans introduce the warm, dry air to the dryer.

Briefly, here is how the contrasting, larger batch drying is carried out: Clarified gelatin solution is pumped from triple effect evaporators through water-cooled tubular-type heat exchangers. Cooled to 90-100 F., the gelatin solution is uniformly spread with a U-type discharge pipe onto endless belts traveling through ammonia-refrigerated cooling tunnels.

As gelatin emerges from each tunnel, it is congealed into a firm jelly-like sheet. Four circular knives, turning on a horizontal shaft, now slit each sheet into five strips. An operator then manually cuts these to lengths that drop onto drying nets traveling on a conveyor belt below. Nets are made of stainless alloy wire (of a very coarse mesh) attached to wooden frames.

Holding about 20 lb. of wet gelatin, nets are loaded in batches of 25 on dollies, which are pushed into forced-air (80-115 F.) tunnel dryers. With this batch method, using circulating, filtered air, drying takes about 24 hr. —about six times longer than the new method.

After removal from dryers, the long strips of dried gelatin are fed to breaking machines, and from here, the product goes to grinders, screens, blender-type mixers, and into the final packages.

End (*Resume reading on page 62*)

ATLAS *announces*

a new line of HIGH MONO food emulsifiers

with optimum balance

HERE'S a new dimension in food emulsifiers. **Optimum Balance** . . . the combination of mono- and diglycerides that assures exceptional performance and economy.

High Mono ATMUL® and ATMOS® emulsifiers offer high mono content **plus** "diglyceride bonus." The high mono content provides more efficient emulsification when combined with the optimum balance of diglycerides. In addition, the diglycerides assure complete dispersion.

Manufactured in new Atlas plants, these food emulsifiers offer you new standards of color, taste, and odor. They are manufactured under strict quality control to assure rigid uniformity. They are available in plastic, flaked or bead form.

The new Atlas high mono food emulsifiers are gaining rapid acceptance in bread, baked goods, ice cream, shortening and numerous other food products. For information write or call Atlas today.

FOOD INDUSTRY DEPARTMENT

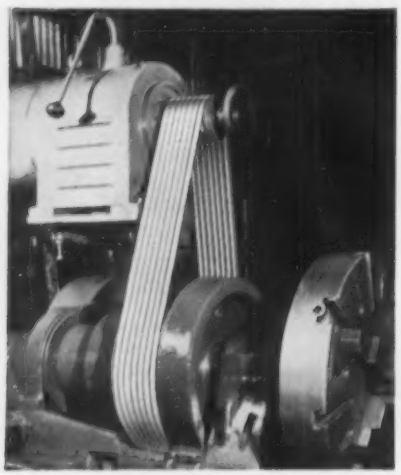
ATLAS

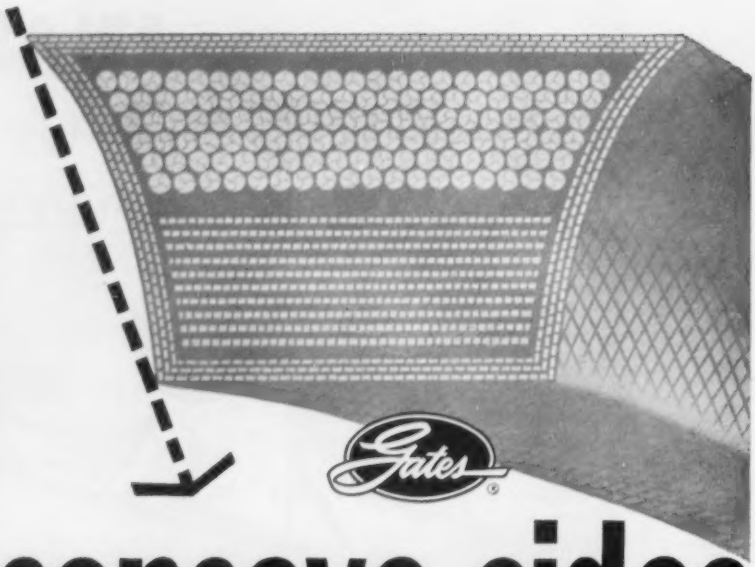
CHEMICALS DIVISION
ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

ATLAS POWDER CO., CANADA, LTD.
BRANTFORD, CANADA

For more information, use coupon on last page.

This large lathe was formerly driven by a flat belt which slipped on heavy cuts, stalled and broke tool bits. Savings on broken tool bits alone offset the cost of the drive the first year—and production was increased 25% after the V-belt drive was installed.

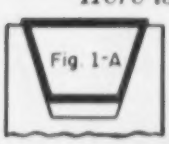




concave sides lengthen V-belt life ...cut costs

Hundreds of plants that keep track of V-belt drive costs know this: Gates Vulco Ropes . . . the V-belts with *concave sides*...wear much longer and *cost less per year of service.*

Here is the interesting reason why:



When a Gates V-belt bends around the sheave, the *precisely-engineered* concave sides (Fig. 1) fill out and become straight. Thus the sides of the belt make full, uniform contact with the pulley (Fig 1-A).

Naturally, uniform contact distributes the wear *evenly.* And *even* wear means *longer* wear.

Longer wear saves not only on replacement costs; it also saves the cost of down-time... keeps equipment producing.

Simple test proves value of concave sides

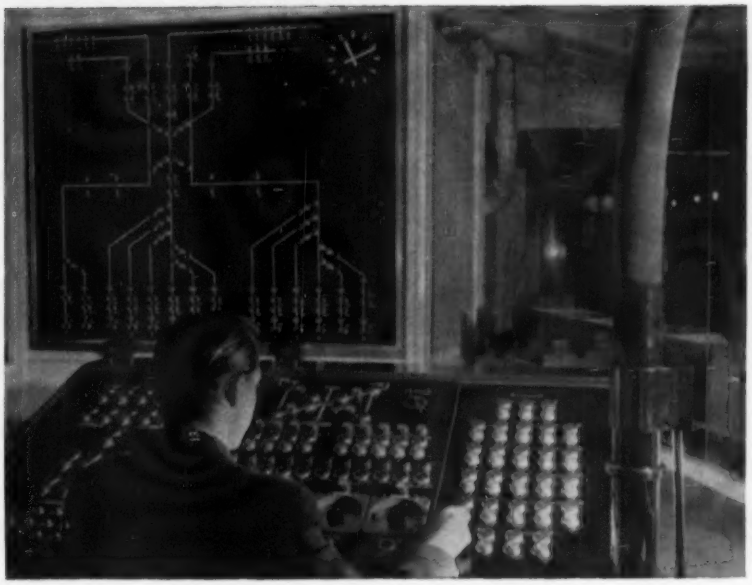
Take a straight-sided V-belt (Fig. 2) and bend it. Feel the sidewalls of the belt bulge out as the belt bends. You see immediately that the bulging sides prevent uniform contact with the pulley (Fig. 2-A). Uneven contact causes faster wear...increases your drive replacement costs.

Let the cost-saving longer life of Gates Vulco Ropes contribute to *your* profits. Specify Gates Vulco Ropes—the V-belts with concave sides (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA-54A

GATES VULCO ROPE DRIVES



CONTROL ROOM DISPATCHER makes up truck orders by pushing buttons, as action diagram (on wall) lights up to indicate switch and conveyor conditions. Note pneumatic tube (right) that delivers invoice copies from office.

Labor and time saved as remote-control switches and photo-eye counters robotize in-and-out movements of trains of empties and fulls

RR-Type Traffic System Speeds Case-Goods Handling

GEORGE E. WILLIAMSON
McGraw-Hill World News

Railroad-style conveyor control has cut manual handling and upped case movement to a 50/min.-clip at Tuborg Breweries, Copenhagen, Denmark.

Further, only two men are needed to operate the complex electronic panels that key this new system (built by Alvey Ferguson, Cincinnati, Ohio).

One man, seated in a receiving booth, shunts incoming empty glass to soakers or side-track storage. The second man, at a shipping control panel (photo), moves full cases to trucks by means of remote-control switches that activates power driven rollers.

The network operates this way: Empties move from outer docks by slow, then fast, roller conveyors to accumulation tracks. Here, they switch to five roller units that feed individual soakers. A feature of the accumulation area is a buffer storage where cases can be removed and stacked to compensate for variations in empty-bottle return volume.

There are track-side photoelectric cells that serve to indicate on control panel whether soaker lines are full or open. Thus operator knows which soakers need glass, and so he can direct cases to the proper track by remote control switches.

He takes his eyes off the control panel only to watch the "trains", as they pass his window. By manipulating switches he can thus separate soft drink and beer cases.

On the city delivery end, outbound beer and soft drinks are sped on their way by a similar system: Beer leaves casing station and descends, by roller conveyor through a switch point to warehouse storage or accumulation tracks. An even production rate has made automatic operation possible at this division point.

At the accumulation area, buffer storage is set up for the different types of beer to adjust for slack shipping hours. Also, this section holds a supply of various soft drinks bottled in another plant.

Four roller tracks are kept filled with the most-sold beer and drink items. A fifth track is used for less popular varieties, which are placed on track when called for.

The five tracks lead to a switch yard, located outside control room window. Photo-eyes on each track actuate counters in the control room. Counters can be preset to give any desired number of cases, and they operate stop controls on the tracks when proper number has been delivered.

To minimize unload-load time, truck driver hands his order in at the gate as he enters plant. Then, while he is unloading his empty glass, order is shot to main office by pneumatic tube, processed, and a copy blown to the control booth.

As trucker moves around building toward the loading area, he stops at the gate and picks up his invoice and docking assignment.

Meanwhile, control room operator checks indicator panel to make sure assigned track is clear of cases, then opens all switches to the track. If there are odd-lot items on the order, he calls buffer area by intercom and asks for the goods to be placed on the fifth track.

Track-control dials are then set for the number of items on the invoice, and operator presses starter button.

Conveyors turn, whereupon cases speed from accumulator tracks to truck-dock track at 50 a minute.

Since this latter track holds a full truck load, operator is free to dispatch another order as soon as the last case has cleared the "points".

In truth, the truck driver cannot keep pace with this fast rate of delivery. Accordingly, a button has been provided, at the end of his track to permit him to stop and start the dock conveyor at will.

AUTHENTICATED · FROM THE CURRENT FILES OF HOERNER BOXES, INC. ·

CASE HISTORY

Re: Vaughan & Bushnell Manufacturing Company

PACKAGING COSTS REDUCED WAREHOUSE SPACE SAVED*

The Vaughan & Bushnell Mfg. Co. of Bushnell, Illinois manufactures mechanics hand tools. For more than 85 years they have been making these tools of the finest quality steel available. Today, Vaughan hammers are known the world over as "the best you can get."

Vaughan & Bushnell insists on quality in packaging, too. And for the past 5 years the Company has worked closely with Hoerner Packaging Engineers to give its products maximum protection in shipment at minimum cost. The result has been a savings in packaging materials costs through efficient package design. And, warehouse space has been saved through pin-point delivery of boxes dove-tailed with production requirements.

*The Hoerner Packaging Engineer responsible: Franklin Calhoun

HOW A HOERNER PACKAGING ENGINEER CAN HELP YOU!

If your company packages things, whatever they are, why not ask us to have a Hoerner Packaging Engineer come in and make an objective study of your packaging operations. It won't cost you a cent or obligate you in any way. It can mean an increased margin of profit through savings in labor and material costs, prevention of shipping losses. Just write to one of the Hoerner plants listed below.

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328 Park Avenue, Urbana, Ohio

HOERNER BOXES, INC.

GENERAL OFFICE: *600 Morgan Street*
Keokuk, Iowa

PLANTS—*Keokuk, Des Moines and Ottumwa, Iowa; Sand Springs, Oklahoma; Minneapolis, Minnesota; Fort Worth, Texas; Sioux Falls, South Dakota; Fort Smith and Little Rock, Arkansas; Mexico City, Mexico*

Packaging Engineers Designers and manufacturers of corrugated boxes.

E. WILLIAM OLCOTT
"Food Engineering," Washington, D. C.

WHITHER FDA?

Recommendations

By Citizens Committee

A STRONG PLEA for increased funds for FDA has been made by The Food & Drug Administration Citizens' Advisory Committee, which surveyed the agency's operations to see how well it was carrying out its responsibilities under the 1938 Food, Drug & Cosmetic Act, and related laws.

Compliance, said the group, is not completely satisfactory. It can be satisfactory only if FDA and its functions are properly understood, supported, financed, and staffed.

"FDA now has insufficient funds, staff, and facilities to meet its essential responsibility of protecting the public health," the committee emphasized, in recommending a three- to four-fold increase in personnel and facilities during the next five to ten years.

FDA should be expanded as fast as it can efficiently absorb new facilities and personnel. A 10 to 20% increase should be made for the fiscal year which begins next July. And similar increases should be made in future years, based on FDA's record in the past year.

Evaluation of the record could be effected by a small citizens advisory group, appointed each year by the Secretary of Health, Education & Welfare, in whose bailiwick FDA falls.

The committee represented food, drug and cosmetic industry groups, professional societies, and consumer groups such as labor unions and women's clubs. Chairman was G. Cullen Thomas, senior vice-president of General Mills. And among its 14 members were Charles Wesley Dunn, president of the Food Law Institute and counsel for the Grocery Manufacturers Assn.; Herbert N. Riley, H. J. Heinz Co., vice-president; and Walter F. Silbersack, president of The American Home Products Co.

In addition to advocating the boost in funds, the committee stressed that FDA can do an effective job "only if it enlarges and improves its educational and information program . . . to develop a better understanding of the objectives and requirements of the food and drug laws." Better and more positive information should be disseminated to industry, involved professions, and the public. "An informed industry or trade association will encourage self-compliance on the part of its members. An informed public will be a better-protected one and will make FDA dollars go further."

Here is a summary of committee observations affecting the food industry:

General Food Enforcement

FDA has not had time or facilities to do more than prevent and correct bad conditions in the most critical

(*Continued on next page, left column*)

Chances Weighed

On the Political Scales

THE REAL QUESTION posed by the report of the citizens committee is this: Will increased money be voted to plug the loopholes in FDA enforcement?

The only answer is: Perhaps. And this answer can be explained only by putting it into the framework of recent FDA history.

Unlike some other investigative and enforcement organizations, FDA has never had an easy time getting money from Congress. It has also had some troubles with the top management in its own department—the 2½-yr-old Department of Health, Education & Welfare.

HEW was an amalgamation of many independent agencies, with its departmental management having considerable administrative and managerial experience, but little specific knowledge of the varied and highly technical work of each agency.

At first, top officials seemed to be afraid to take the word of the career civil servants as to what the levels were at which operations should be carried out. And this situation still obtains to some extent.

It was during this time that FDA was also faring badly at the hands of Congress. The then-chairman of the powerful House Appropriations Committee, John Taber, and the head of the subcommittee which handled FDA appropriations, Fred Busbey, were both "adverse."

Taber felt that an FDA seizure in his district of some moldy berries, also a turn-down by the agency of a proposed manufacture of balls of beetroot (on the grounds they could be confused with the much more expensive baby beets), were arbitrary and unjustified actions.

Busbey was upset over seizures of spring water on the basis of alleged therapeutic claims.

As a result of their teamwork, and reluctance of top agency officials to fight for FDA, the agency was cut to $5.1 million from the $5.6 million it had during Truman's last year (FE, Mar., p. 195).

At this point, the then-commissioner of FDA, Charles Crawford, got fed up. He was physically tired and sick, and distressed that the agency he had been with for over 30 yr. was taking such a beating.

And having been unable to get an appointment to see HEW Secretary Hobby, he finally told Undersecretary Nelson Rockefeller:

"All right, FDA is getting slapped around. Now either our own department backs us up or puts us in our place. Are you with us or against us? Are we doing a good job, or are we just being bureaucrats? Why don't you appoint a committee of respected, qualified, impartial private citizens to investigate us once and for all, and either vindicate us or tell us where we're wrong?"

(*Continued on next page, right column*)

Recommendations (Cont'd)

cases. Its programs are well organized to effect reasonable working control in proportion to actual and potential hazards in the principal food commodity groups.

Some important concerns, however, have not been checked for years, and some inspectors appear inclined to spend too much time visiting the better modern plants for their own education.

There should be at least some action in each of the three major violation categories—hazards to health, filth and decompositions, and economic violations. In the future, FDA especially should not announce to industry and public that economic violations will receive little or no attention.

The agency has a reasonable, cooperative reputation with responsible parts of industry (most complaints about it seem to come from the always-present small group of marginal operators).

There should be a much broader dissemination of FDA policies and principles. The agency should produce leaflets or pamphlets written in nonlegal terms that discuss what the manufacturer, packer, and distributor must do to comply with the law. New policies should not first be revealed in a legal proceeding.

Legal actions, generally, should be used for flagrant or deliberate practices seriously hazardous to health or of substantial economic importance.

On lesser violations, especially when accidental, the agency should use voluntary compliance. It should also encourage, on the part of field people, greater use of judgment and discretion for informally disposing of problems, especially where integrity of the specific companies involved is known or knowable.

FDA should encourage food groups to improve their own practices through informal commodity-and-product standards of purity, labeling, and sanitation. Congress should be asked for a law exempting such cooperation from being an anti-trust violation.

Food Standards

FDA has the authority to establish standards of identity, quality, and container fill. The many sorely-needed standards thus set on frequently-used foods since 1938 have protected the consumer by specifying purity, nourishment, flavor, color, and uniform composition, as well as working against under-filled containers and deceptive packaging.

In addition, certain standards have been created by which industry may be guarded against unfair competition.

These objectives are necessary, and should be continued to the maximum, consistent with efficiency and public interest.

However, FDA has set some standards in areas where there is little controversy. Enforcement here should be minimized, and new standards should not be set.

Where hearings have been held on prospective standards, they should be completed as soon as possible.

The rising production of "convenience foods" makes urgently necessary standards for such foods as frozen fruits, frozen juice concentrates, frozen fish, canned salmon and tuna, frozen vegetables, and frozen fowl.

In setting any standards, FDA should try to cut the time taken to an absolute minimum, even at risk of future lawsuits. When possible, standards should be written to be adoptable under the Hale Standards Amendment (Sec. 401 B).

Standards should allow changes for improvement of quality or value or advent of new forms or varities.

(*Continued on page 192*)

Chances (Cont'd)

specific proposal, which he later "sold" to Mrs. Hobby.

Meanwhile, Crawford had decided to retire. The argument then came up as to whether someone from FDA or someone from the outside should be appointed commissioner. Mrs. Hobby and Rockefeller decided that an outside man should be named.

After some winnowing of names, they decided upon James B. Mintener, then general counsel of Pillsbury Mills. Mintener, while in Philadelphia preparing for a FTC hearing, got an invitation to the White House, and there Mrs. Hobby and Rockefeller broached the proposal. Mintener objected, saying that the job should go to a career man. Former Deputy Commissioner George Larrick was then appointed.

Some time later, Mintener got another Washington invitation. This time, he was asked to become Assistant HEW Secretary, a post which he accepted. He enthusiastically took up the recommendation for a citizens' committee. Additionally, he plugged for more FDA funds, and a 7% up was granted for fiscal '56.

While this budget increase was going through the long chain of reviews that every such request must go through, the citizens group was named.

The group held two overall meetings in Washington, and small task-forces checked into specific parts of the FDA program, visiting field offices and checking on activities. The recommendations drawn up went to every member for study and concurrence. And there was no dissent made by any one of the 14 members to the recommendation for three- to four-fold increase in the agency, or to any of the other 109 specific points.

Money Most Difficult

The recommendation of a larger budget for the agency is, of course, the one which will be most difficult to put into effect. But it will be an easier job than it might have been, with Mintener in the top levels. Getting it through Congress, however, will still be an effort.

The 7% increase voted this year, with full departmental support, got much of its impetus from the fact that FDA had to admit it couldn't adequately enforce the oleomargarine laws. In fact, the House Appropriations Committee limited use of the increase to enforcement of these laws, and to those parts of FDA activities protecting against filthy products and those endangering health. The so-called "economic" violations, underfilling, using substandard ingredients in foods covered by identity standards, and similar violations virtually undetectable by the consumer, were not to be enforced with this increased appropriation.

Because of this Congressional reluctance, it will take some pushing to get the recommended new increases through. A minimum of effort would include an invitation from the department to Advisory Committee Chairman Thomas to appear with it before Congress. And it might be more effective to have all members appear there.

It's certain to take closer to 10 yr. than 5 for the recommended increase to be voted, assuming a gradual increase. With a 20%-per-year increase, it would take 6 yr. to triple FDA's size and 8 to increase it four times. With a 10%-per-year boost, 12 and 16 yr., respectively would be needed.

The FDA has already started putting into effect the committee recommendations that do not require more funds. But these are few compared to those where more money will be needed.

—*End*—

This cherry *is the one to pick to make your money-makers*

Come to Norda now, for your profit producers. Use Norda Flavors in your fine mixes that make fine products taste wonderfully real. Use Norda *nodes*. Norda nodes are *in-blown* flavors—with the flavor sealed in and locked in by amazing colloid protection. Natural and imitation Norda Flavors now have a new *in-grown* richness that tastes like true, fresh fruit. Norda nodes flood foods with flavor, the moment liquids are added to mixes.

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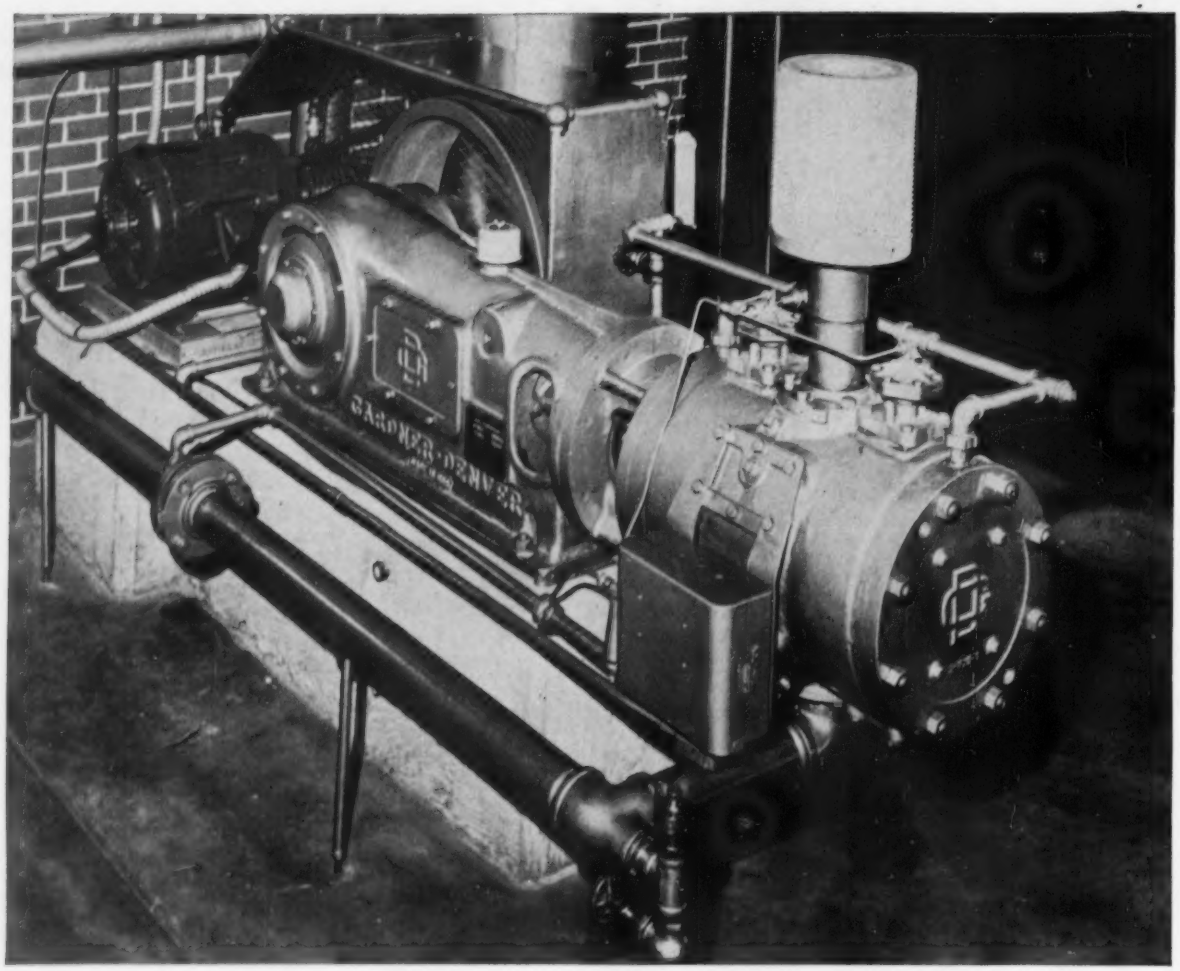

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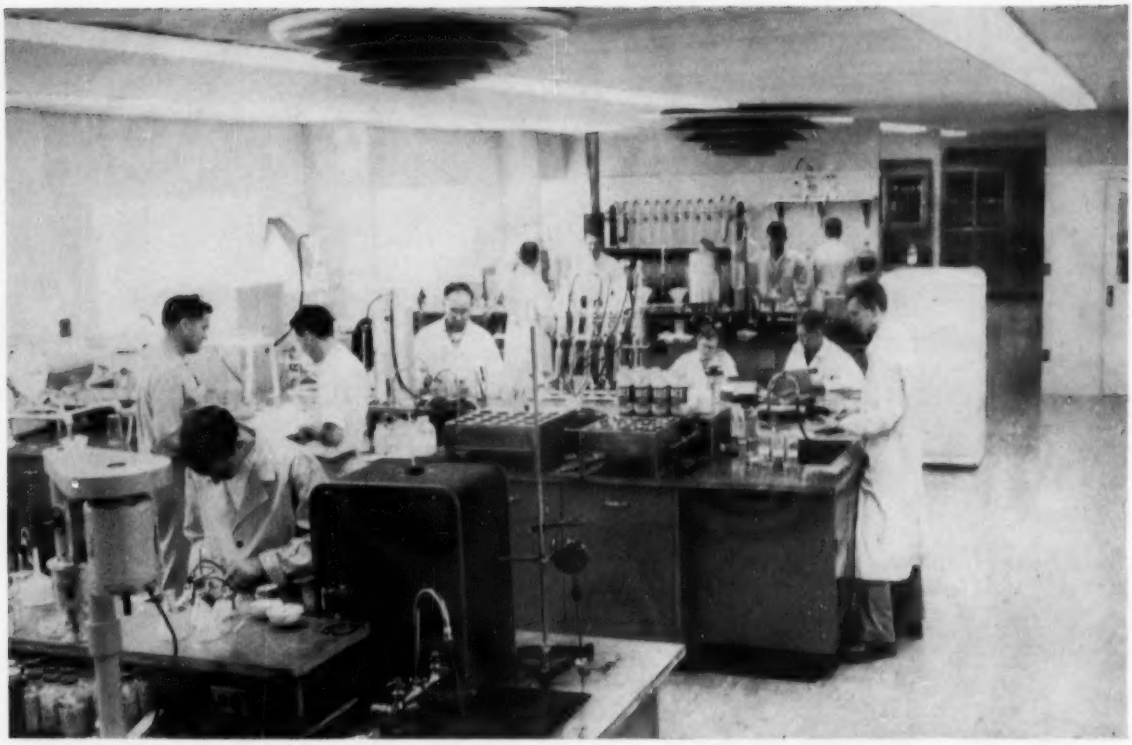

AT HUBINGER'S new laboratory, skilled scientists and technicians handle many problems pertaining to production control of refined starch products. Also investigated are development of newer and better products, and improved methods for their use in the food industry.

Another Boost for Research

By providing its technologists with better-than-ever facilities, Hubinger is now set up to turn out a wider variety of precisely checked products

FE STAFF

Key to the steady growth enjoyed by corn refiners over the years has been the constant striving of their laboratories in technical research.

Equally important has been the painstaking emphasis on quality control, coupled with technical services to users.

Exemplifying the front-runners in this field is The Hubinger Co., 75-yr. old Keokuk, Iowa, firm. Its management has paid prime attention to research, development, and product testing.

▶ Outstanding here is the company's new laboratory that is now implementing the program for improving production techniques, corn products, and their employment in the food and other industries.

"Within the past 10-15 yr.," says President Roy L. Krueger, "new uses of products from corn have been rapidly increasing—entailing new rigid specifications that have urgently required additional laboratory-control facilities. Accordingly, we have brought to bear the most advanced facilities."

Considerable planning went into the new 36x101-ft., three-story laboratory, with flexibility keynoting the construction. The structure employs reinforced concrete and Hadite blocks, with a buff brick veneer. Second and 3rd floors are covered with rubber tile. Walls are 2-tone green.

Deep panels of glass block extend around the building to flood laboratory areas with easy-vision light. Further aid is an air conditioning system.

A Reynolds aluminum acoustical system was installed for two purposes: To reduce noise about 90% and to enable quick access of utility men to piping, etc. System comprises perforated aluminum panels overlaid with 1½-in. sheets of Fiberglas. Panels are supported from ceilings by aluminum angle irons and between walls and ceiling by T-sections.

At the present time, only the 1st and 2nd floors are used as laboratories. However, the 3rd floor was designed for easy conversion when needed. It is now occupied by the engineering and personnel departments.

The Pilot Plant

About half of the first floor is devoted to the pilot plant. Here, seven specialists use miniature-size equipment in processing and product experiment. Three work on food problems, two on textiles, and two on packaging. (*Turn to* page 143)

IN THIS novel Armour truck-park, individual lines from special servicing island feed protecting current to vehicle engine-heaters (above). Note control center (arrow) that activates system whenever outside temperature falls below 30 deg. F. In summer, hookup runs refrigeration units that cool truck bodies.

Open-Air "Garaging" Wins 3-Way Savings

Automatic electric supply turns the trick to cut building, maintenance, and over-time expenses

A NEW "WRINKLE" in truck fleet operation is paying off at Armour and Company, Chicago: This firm now keeps its trucks outdoors the year-around—and thereby is realizing notable savings in overall costs.

Sounds contradictory. But months of operating, spanning last winter's cold snaps and this summer's heat waves, have borne out the dollar-benefits of the new system.

Unique here is the central role played by a special new parking lot, designed by George A. Rupprecht, truck maintenance superintendent. This facility eliminates the high cost of garage building, and thus wins direct economies.

Truck engines are kept warm, through winter nights, by immersion-type heaters installed on each vehicle. Units connect to a central electric power supply, assuring trouble-free, automatic operation.

Thus, drivers can start trucks instantly in the morning, and so both delivery delays and over-time wage payments are eliminated. Further, this system permits use of a higher-viscosity motor oil, which lengthens truck-engine life and reduces maintenance expenses.

This is a dual-purpose setup—also working during the summer to keep bodies refrigerated below the danger point.

Control-System Details

The parking area is 200 ft. long and divided lengthwise by a low, concrete servicing island, against which the vehicles are headed. There is room for 40 trucks and tractor-trailers—20 on each side.

This island is guarded by 2-ft.-high

DOW PROPYLENE GLYCOL, U. S. P.

VERSATILE SOLVENT FOR BETTER FOOD FLAVORS

. . . offering higher solvent efficiency over a broad range of flavoring and coloring materials

Improving flavors for tasty baked goods or soft drinks, even orange ice—these are all tasks regularly assigned to Dow propylene glycol, U.S.P.

This highly effective solvent has become an accepted standard for flavors, extracts and flavor concentrates. Many makers of food colors, too, have replaced other solvents with propylene glycol—with remarkable savings and only minor changes in formulation.

The dependable quality and prompt delivery of Dow propylene glycol, U.S.P., can also simplify your production and scheduling. Evaluate it soon in your own laboratory. Write for a free sample and property information to THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. OC 810E.

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DOW

For more information, use coupon on last page.

where it touches food

USE STAINLESS

...for cleaner, more economical processing

Check through this list of advantages and you'll see why Crucible Rezistal® Stainless Steels have gained such wide acceptance in the meat and food processing industries —

- **Do not change the flavor or appearance of food in any way.**
- **Resist the corrosive attack of food acids and other elements.**
- **Withstand harsh cleaning chemicals that might affect other metals.**
- **Clean easily without developing the rough spots that harbor bacteria.**
- **Can't chip . . . they're solid stainless all the way through.**

Crucible Stainless Steels offer another practical advantage — *ease of fabrication.* You can bend them, shape them, weld them, machine them — make any equipment, no matter how complex, out of Crucible stainless. But let us help you decide how to put stainless steel to work for you. For fast action — call Crucible. *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

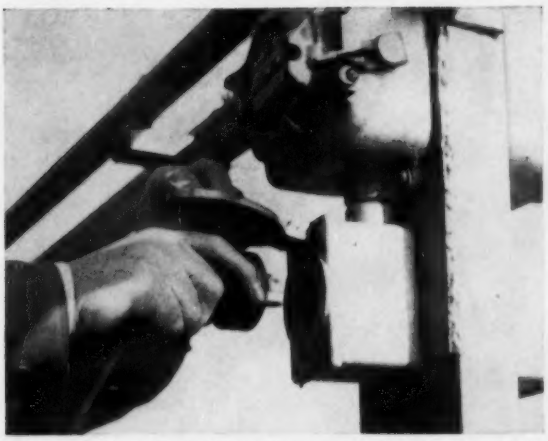
Crucible Stainless Types for Food Processing

STAINLESS REZISTAL TYPE	NOMINAL %* Cr	Ni	Other	USED FOR
302	18	8		General Purpose
303	18	8	S or Se	Free-machining
304	19	9	.08% Max. C	Welding
316	18	12	Mo	High Corrosion-Resistance
304 LC	19	9	.03% Max. C	Used where intricate welding is required
316 LC	18	12	Mo Low C	Used where intricate welding is required
347	18	8	Cb	Welding (stabilized)

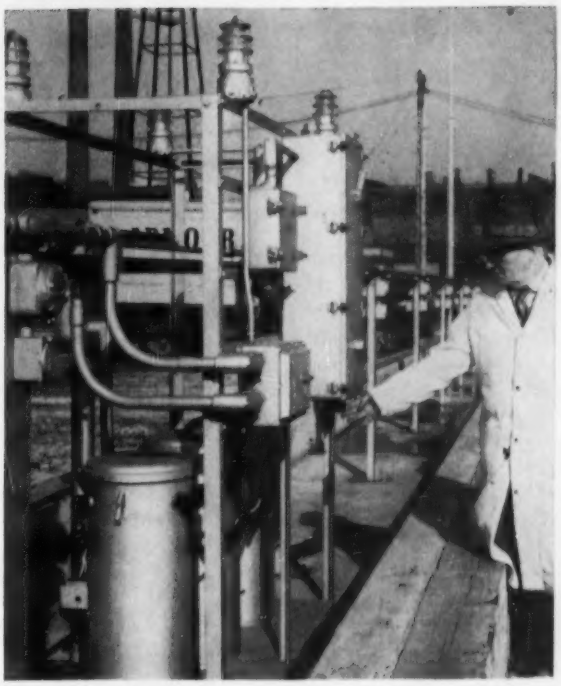
*Subject to U. S. Government restrictions.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



DRIVER plugs cord from engine heater (or refrigeration unit) into electric receptacle and flips switch. Then . . .



. . . THIS CENTRAL CONTROL unit takes over. Note transformers (lower left) that pass current through automatic switches to truck stations. If one of lights atop framework blinks out, park operator knows instantly that a line has failed and quickly remedies it.

cement curbs, containing 12x12 in. timber inserts to prevent chipping.

Two 1¼-in. electric conduits, mounted 4 ft. off the ground on 6-in. channel uprights, run the entire length of the island. Each conduit encloses two insulated cables—one carrying 220v., single-phase current for the truck heaters, the other 220v., three-phase electricity for refrigeration units.

A current-control center is located midway on the island. This consists of three transformers, equipped with both manual and thermostatic controls, and a switch-control panel.

Circuits are divided into four sections—two serving either side of the control center. Each section is separately fused and contains ten individual circuits that terminate in moisture- and explosion-proof lock switches and 4-way grounded plug receptacles.

The 40 switch-and-plug sets are mounted on each side of the 20 conduit-support channel irons.

Four pilot lamps, located at the four corners of the control framework, light up when current is flowing through the sections. They are visible from any part of the lot, thus any power failure is immediately spotted.

To complete the parking facilities, two 30-ft. light towers, equipped with double reflectors, provide night-time illumination for the island.

Winter-Summer Operation

After his route delivery is completed, each driver pulls his truck into the area and stops in front of one of the island's electrical receptacle stations. During cold weather (from about Nov. 15 through Apr. 15), he plugs in the electric cord connected to engine heater and flips switch.

Circuit controls, that have been previously set to provide single-phase current, then take over. Heaters start anytime outside temperature is below 30 deg. F., and they are shut off by the control-center thermostat when temperature rises above this point.

During hot weather, operation is similar, except that three-phase current under manual controls flows through the cables. At this time, driver plugs in a cord attached to truck refrigeration compressor. Then when load temperature reaches the desired point, current is shut off by thermostat inside the truck body.

● ● ●

Open-Can Cooking

—*Continued from page 49*

inverted can? Here, the problem was solved with use of specially constructed trays which are locked into place on the conveyor chain by a grid. Latter fits over the cans and retains the fish during inverted passes. Drainage is caught in pans that run the length of the chain.

Cooker's operating schedule calls for 7½ min. in the steam zone with cans in the upright position. This is followed immediately by 22 min. of alternately inverted and upright passes through the oven section, during which product temperature increases to a high of 222 F. Last pass, made in 6 min., carries cans under the heating zone, therefore discharge temperature drops to 199 F.

Total time from loading to discharge is about 39 min., during which all variables are automatically controlled for product uniformity.

Control Panel

Speed of the conveyor chain is coordinated with processing temperature by a control panel—an integral part of the automatic system. An 8-in. dial thermometer, scaled from 0 to 240 F. in 2-deg. divisions, and a ¾-in. self-acting temperature controller regulate temperature in steam zone.

Temperature in the three sections of the hot-air oven are regulated by a temperature controller and three-pen recorder. Each temperature is indicated in a different ink color, which facilitates frequent checks.

Other panel components include a pushbutton and selector switch (for starting and controlling motion of the conveyor), switches and starters for fans, and a fused safety switch.

End (*Resume reading on page 50*)

In Behalf of Progress . . .

Pace-Setting Research Gives You a Yardstick

How much research should your company do?

It is well known that average expenditures for research in the food manufacturing and processing industry are embarrassingly small.

And some firms seem to consider it an expensive luxury to probe into the unknown.

Then, the amount of research naturally varies with type and size of company.

So let's approach the answer to the opening question by citing an example. We'll take a pace-setter—General Foods Corp.—which has consistently increased its business with a broad line of products.

With net sales in fiscal 1955 of $824.8 million, this firm spent approximately $5.8 million for research. This is a little over 0.7% of the sales dollar. Or looking at it another way, research dollars amounted to more than 18% of earnings after taxes.

More than 750 people are employed in GF's laboratories, about half of them as technical or professional specialists.

Yet, GF is not satisfied. It plans to build a big new research center. And it has adopted a new concept of research. In the past, the company's scientists concentrated on previously identified problems related to company business. In the future, they also will undertake far-reaching technical explorations with the broad purpose of discovering new business opportunities.

Is so much research good? Should your company's scientific program be proportionately large?

Maybe there's an answer in the success of General Foods. In the past fiscal year, its net sales increased 5.4%, or $42 million. Some of this is attributable to higher coffee prices. But soluble coffee sales increased in volume. And among products other than coffee, more than half the increase is due to higher unit volume.

Now GF turns out no product whose sales volume is not influenced by product or process know-how that comes from research. And sales of new products—many of them created through research—have increased at a faster rate than total sales. In fact, these items accounted for $237.5 million of the net, an increase of 27.7% over the year before.

In the past year, GF researchers came up with Apple Jell-O, new Swans Down Instant Cake Mixes, Minute-Man Instant Frosting Mix, and a special soluble coffee for vending machines.

More, they developed improvements in packaging and processing.

So we think GF's research program proves at least one significant point. Good research is not a luxury. It does not cost money—it makes money. Then, too, it is insurance against the future.

Another ray of light on research comes from a survey made by General Foods among executives with firms accounting for half of all employment in the grocery manufacturing field.

Of these executives, 85% foresee a large or moderate increase in research and development expenditures in the industry.

Perhaps even more significant, revolutionary new developments are expected by 40% in the area of new products in their own companies—by 33% in manufacturing and processing methods—and by 33% in packaging materials and methods. Moderate changes are anticipated by 50, 60, and 47%, respectively.

Product development, particularly of convenience foods, will be one of the prime targets of research. Sixty-three percent see this as the area that will receive most attention in the next ten years.

This survey broadens the base for sizing up your own research activities. For it reveals the future trend in a large segment of the industry in which you are competing.

If you need any further stimulant, perhaps this will do: In the 1948-54 period there were 243 mergers of food manufacturers.

Research is one way to stay in business.

Let's Have Action on FDA

That the Food & Drug Administration is being short-changed in funds is obvious, as we pointed out in March.

This is documented in the report released in June by Citizens Advisory Committee on FDA, which finds that:

1. FDA now has insufficient funds, staff, and facilities to meet its essential responsibility of protecting public health.

2. FDA can do an effective job only if it improves its educational program.

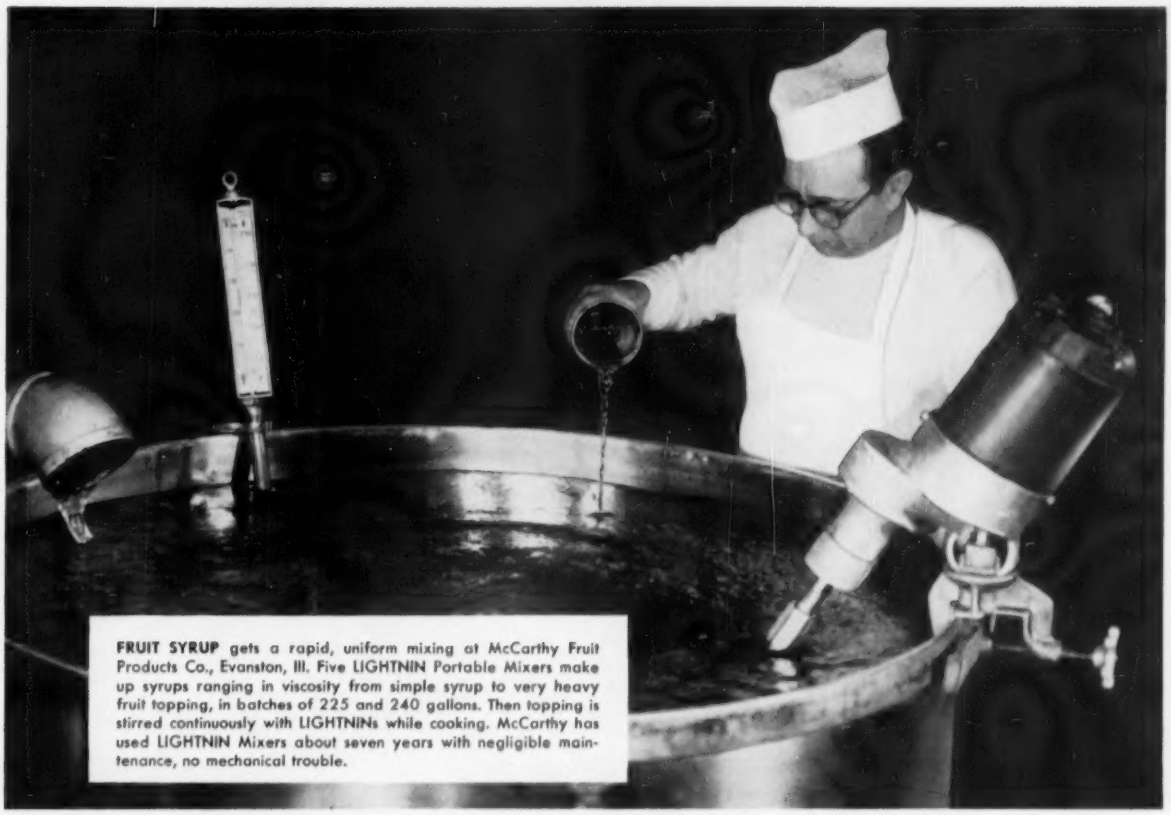
3. Legal actions have been allowed to drag out far too long.

4. There should be better management of FDA's affairs.

None of these situations can be corrected without money. Yet the 1955 allotment for FDA was half a million dollars less than in 1953.

This has reduced personnel, caused lab equipment to become out of date, curtailed field travel by inspectors, stymied development of a program of educational cooperation with industry, and resulted in a shortage of legal personnel.

Logic alone should have brought more money for FDA. Now with detailed evidence presented in the report, Congress should quickly correct the situation. And our industry ought to exert its influence.



FRUIT SYRUP gets a rapid, uniform mixing at McCarthy Fruit Products Co., Evanston, Ill. Five LIGHTNIN Portable Mixers make up syrups ranging in viscosity from simple syrup to very heavy fruit topping, in batches of 225 and 240 gallons. Then topping is stirred continuously with LIGHTNINs while cooking. McCarthy has used LIGHTNIN Mixers about seven years with negligible maintenance, no mechanical trouble.

How McCarthy Fruit Products mixes syrups **without trouble**

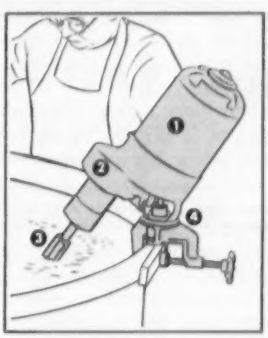
The McCarthy Fruit Products story is typical: "Efficient mixing . . . no difficulties."

And it's the same story we get from food processors everywhere who are using LIGHTNIN Mixers. Many of them have been using the *same* LIGHTNINs for 20 years or more.

You can get LIGHTNINs to handle *all* your fluid mixing—in any open or closed tank of any size or shape. Thirty portable models, in sizes from ⅛ to 3 HP. Other types from 1/42 to 500 HP. Mixing results are fully guaranteed.

For quick service, just call your LIGHTNIN Mixer representative. He's listed in your copy of Thomas' Register. Or write us today.

McCarthy gets these advantages with LIGHTNIN Mixers. You can, too.



1. Ball bearing motor. Continuous heavy-duty type. Bearings are prelubricated and permanently sealed.

2. Quiet gears (in gear drive models). Precision cut, specially hardened, sealed in lubricant bath.

3. Easy shaft adjustment. Two-piece chuck grips shaft permanently—yet loosens instantly if you want to adjust, remove or change shaft.

4. Ball and socket clamp instantly locks the mixer at any angle for the desired mixing action. Quick, positive lock requires no wrench to tighten.

Lightnin® Mixers™

MIXCO fluid mixing specialists

Get these helpful facts on mixing: cost-cutting ideas on mixer selection; best type of vessel; installation and operating hints; full description of LIGHTNIN Mixers. Free—no obligation. Just check data you want, tear out and mail to us today with your name and company address.

- ☐ B-102 Top Entering Mixers (turbine and paddle types)
- ☐ B-103 Top Entering Mixers (propeller types)
- ☐ B-104 Side Entering Mixers
- ☐ B-107 Mixing Data Sheet
- ☐ B-108 Portable Mixers (electric and air driven)
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- ☐ B-111 LIGHTNIN Rotary Mechanical Seals
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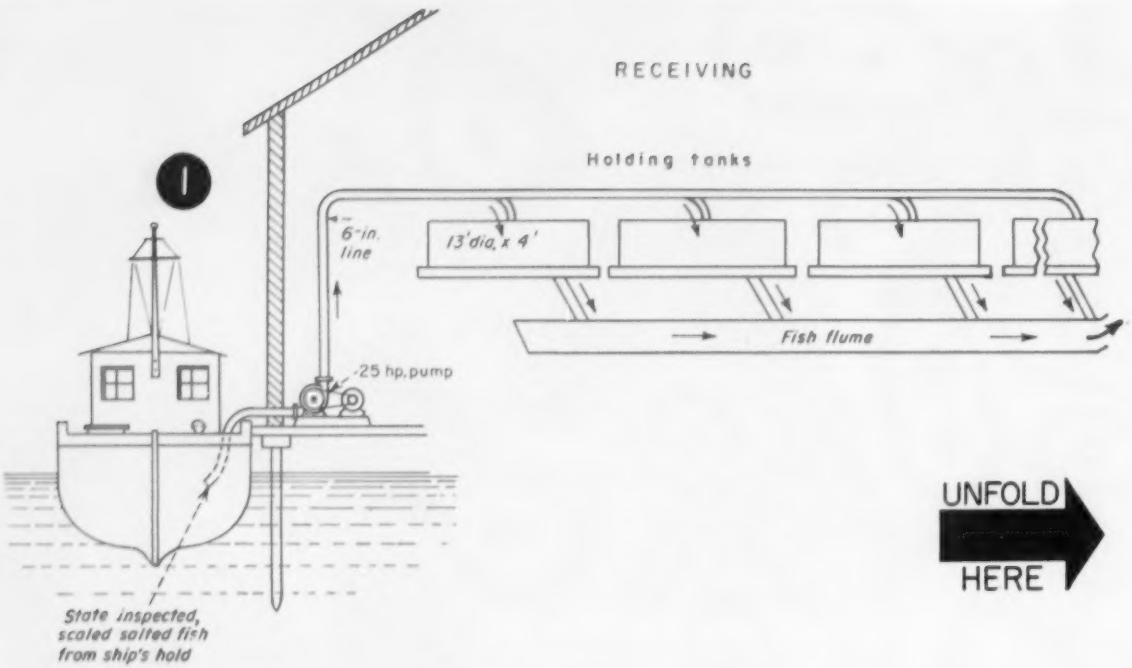
MIXING EQUIPMENT Co., Inc., 143-h Mt. Read Blvd., Rochester 11, N. Y.
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 10, Ont.



UNFOLD HERE

Advanced Sardine-Canning Operation

Appearance, Flavor Upped in Instrument-Keyed, Non-Stop Process

PRODUCTION OF UNIFORM-QUALITY canned fish, through use of modern instrument-controlled equipment, particularly distinguishes the sardine-canning operations at Green Island Packing Co., Rockland, Me. A feature is baking of the product.

From ship's hold—Point (1) on accompanying fold-out flowsheet—salted sardines, which have been state inspected, are hydraulically pumped via a 6-in. line to four wood storage tanks (13 ft. dia. x 4 ft. high) in the plant. Here, they are held in saturated brine.

From tanks, fish are then flumed to a collection point (2), where an open metal-mesh belt conveyor, equipped with flights, raises them to a continuous rubber-belt carrier. Later supplies packing operator stations (3) on both sides of the belt. Empty cans are delivered to packers by another belt directly above the fish carrier.

For the story behind this Flowsheet, see p. 48

Girls shunt raw sardines from belt to table as needed, while the excess is recycled. Using scissors, they remove heads and tails. These drop through a table opening onto a belt that conveys them to an outside storage tank. This material is sold as fertilizer.

Back on the line, operators cut the edible portions to size, pack them in cans, and place filled cans on specially shaped trays.

Filled trays, containing 32 cans, are picked up by collectors, who stack them in carts for delivery to feed end of FMC continuous sardine cooker and over (4), in which the fish are baked.

Trays are manually transferred from carts to cooker carrying chain. Here, a grid, placed over each filled tray, is automatically locked in place. Grid retains fish in cans as they travel through cooker. Eight trays per min. enter horizontally, then as they start up 135 deg. incline to top of cooker, fish are given a high-pressure, water-spray wash (for thorough cleaning), and allowed to drain.

Cooker has five zones. In the first (top), fish are steam-cooked in a right-side-up position. From steam chest, cans of sardines continue upside-down (fish held by grid) to the next lower level—a hot-air chamber. Fish travel through four hot-air zones, with can position alternated (up, down) in successive passes. Product temperature is increased in each zone to remove moisture and give the fish a toasted appearance.

Any drainage from inverted cans is caught in pans, which run the length of the cooker. Time of run in each zone is regulated, and temperature in each is under automatic-instrument control. Thus, product uniformity is assured.

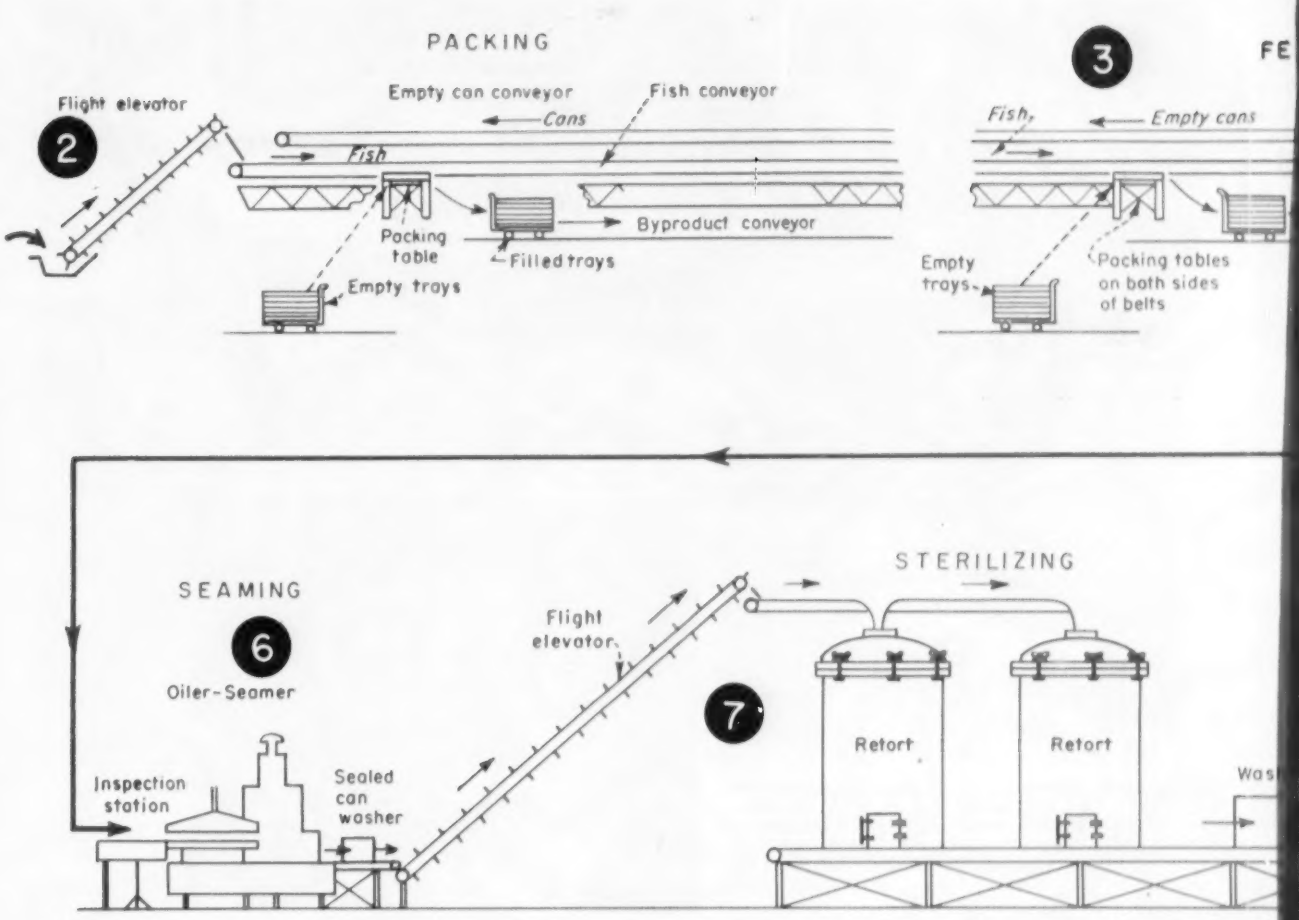
As cans emerge from cooker discharge (5), grids are automatically unlocked from trays and manually placed on a mesh conveyor that returns them to feed end of cooker. Trays are automatically disengaged from cooker chain, and hot cans are shunted from trays to a conveyor that takes them past inspectors. Empty trays, lifted off the cooker discharge deck, are placed on carts and returned to packers.

Inspected cans go via conveyor to combination oiler-sealer (6). Sealed cans are passed through a spray-type washer, which removes exterior oil. Washed cans are then raised to the second floor by flight conveyor, where they are transferred to a carrier feeding the retorts (7).

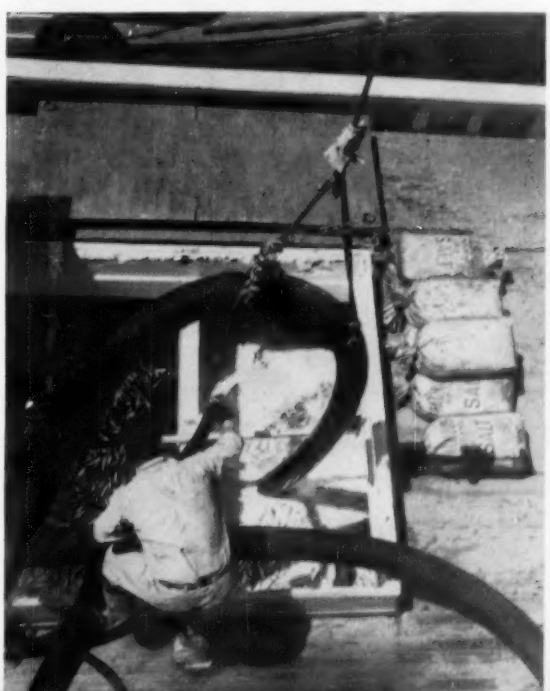
Prior to can loading, retorts are filled with water, which cushions incoming cans. When loaded, retorts are drained, sealed, vented, and steam-heated at 240 F. for 40 min. After release of steam, retort is again filled with cold water to cool cans.

Sterilized and partially cooled, cans discharge by gravity through a hinged side-door just above base of retort. They go to a second washer, then onto a conveyor that takes them to second-floor storage bins.

Here, they cool to air temperature. From bins, cans are manually packed into cases (100 cans per case). Loaded cases travel by conveyor to automatic sealer (8), and, subsequently they go on to shipment or storage.

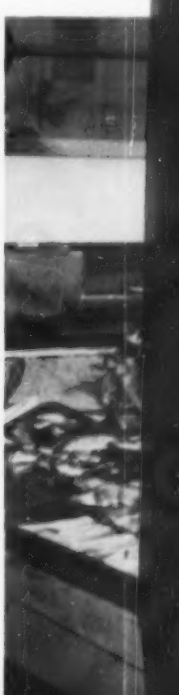


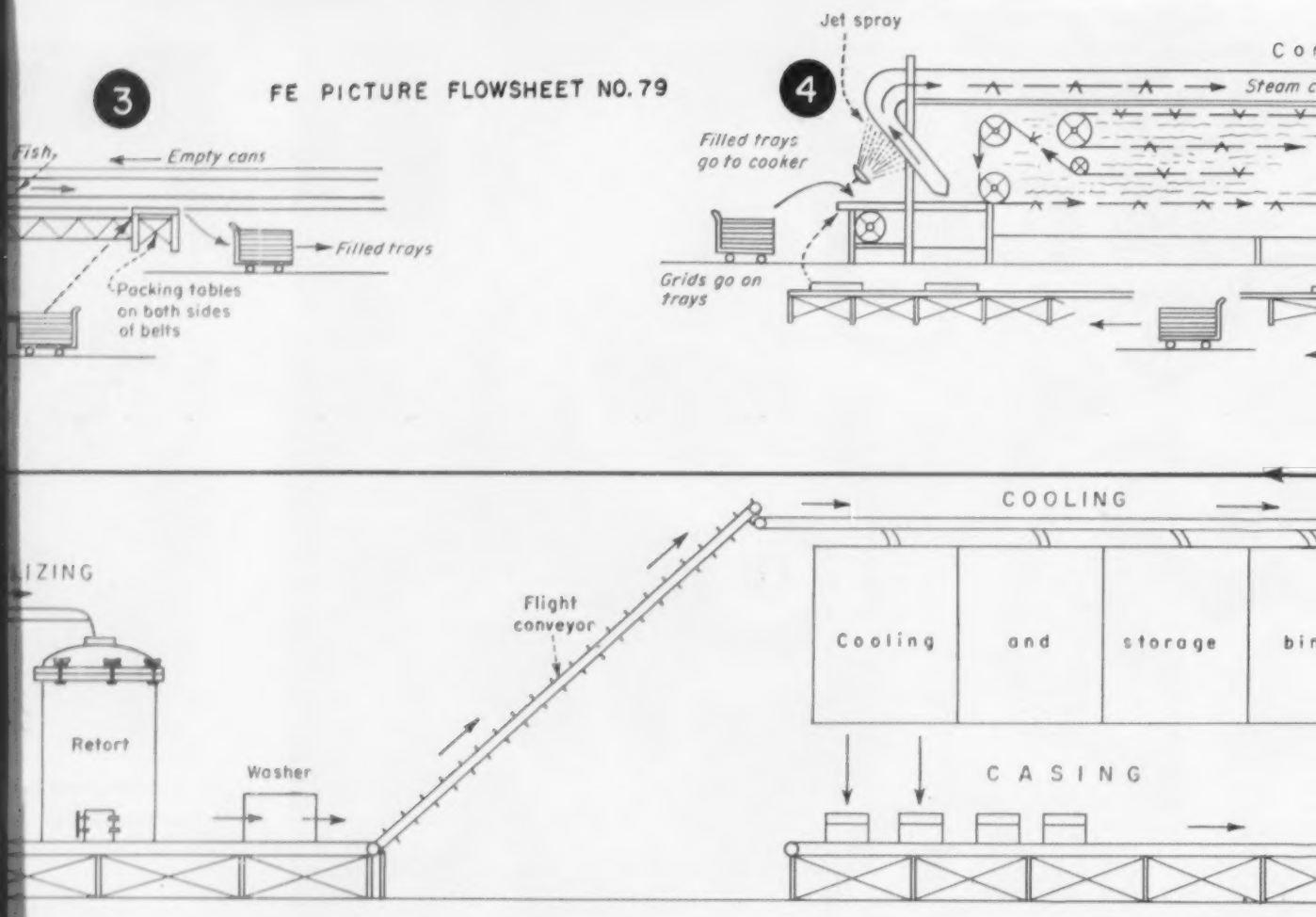
1 **SALTED SARDINES** are fluidized in ship's hold, then pumped through 6-in. line to cannery holding tanks, where they are held in saturated brine.



2 **FROM STORAGE,** flume carries fish to belt conveyor (right) leading up to packing. Note fish-recirculating trough (left).

3 **USING SC** move head filled and plac



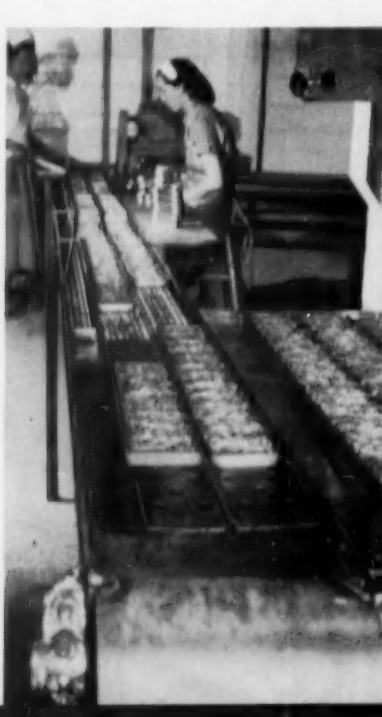


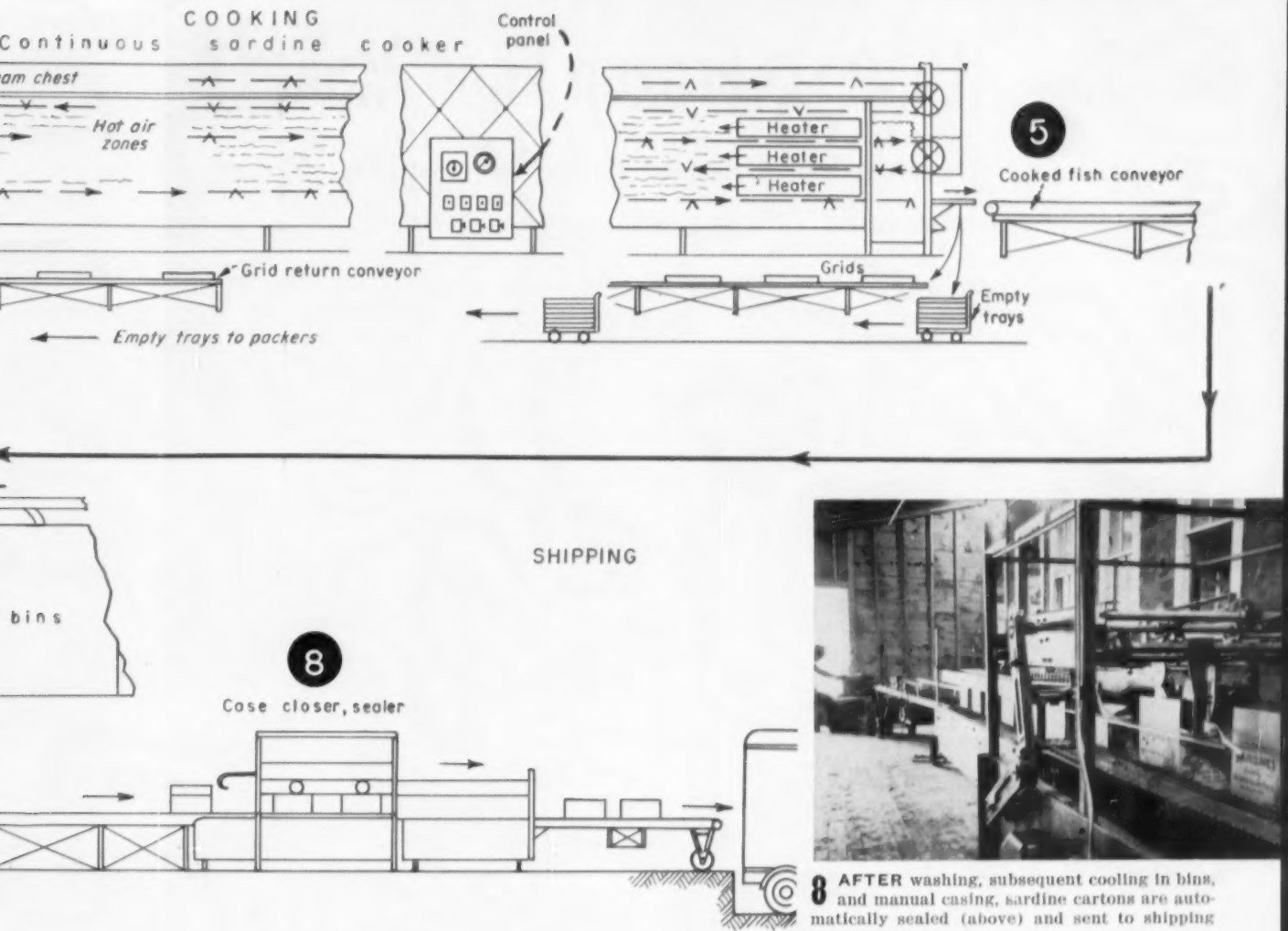
...h to belt ...ing. Note

3 USING SCISSORS, operators remove heads and tails. Cans are filled and placed on special trays.

4 FILLED TRAYS, stacked in carts, go to feed end (rear) of FMC cooker. Workers are seen placing grid over tray.

5 AT EXIT, (right), grids automati... unlock and hot cans are shunted to ...veyor taking them past inspectors (r...



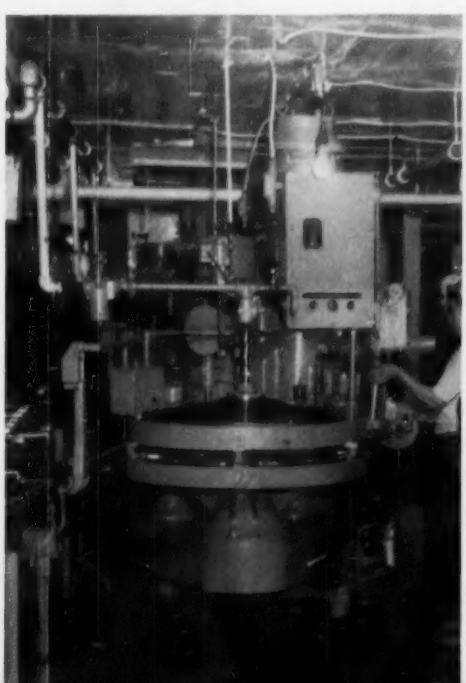


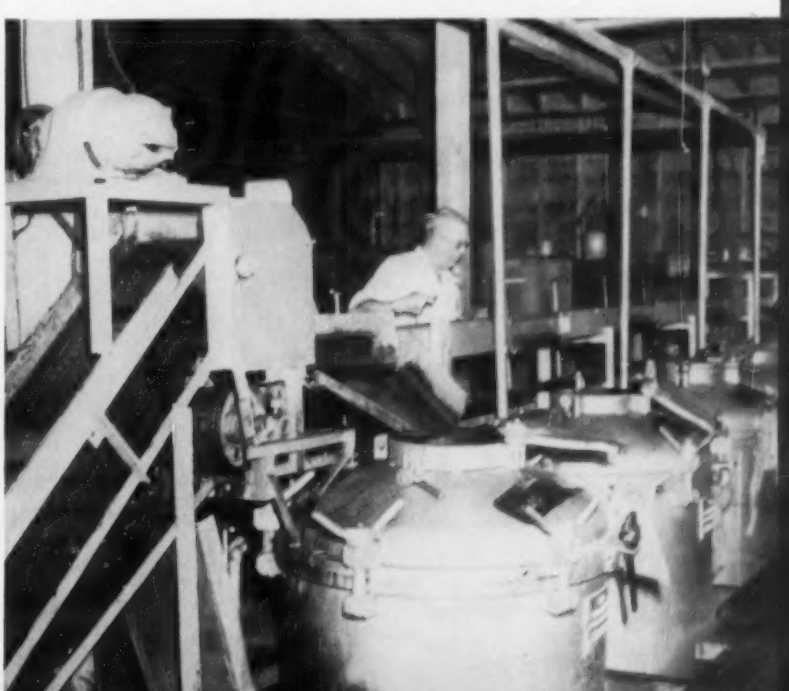
8 AFTER washing, subsequent cooling in bins, and manual casing, sardine cartons are automatically sealed (above) and sent to shipping or storage.

omatically
ed to con-
rs (rear).

6 INSPECTED CANS go via conveyor to this oiler-sealer. Later, they move through spray-type washer to remove exterior oil.

7 BATTERY OF RETORTS. Water is put in them to cushion incoming cans. After draining, sealing, and venting, vessels are steam-heated at 240 F. for 40 min. Then cold water is added for partial cooling.

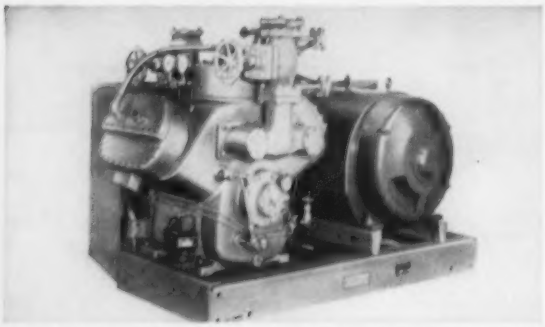




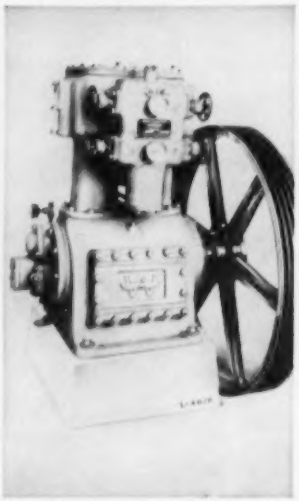
Butcher...Baker...Frozen Food Maker?

Worthington makes the right size of ammonia compressor to refrigerate <u>your</u> product

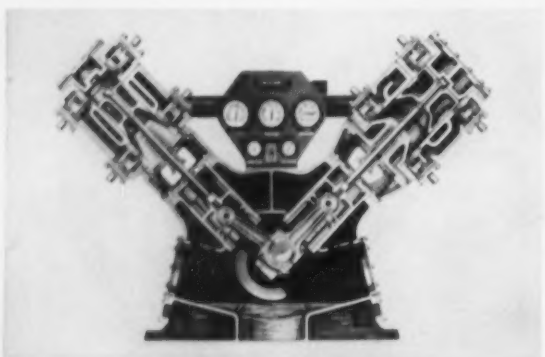
No matter what type of food processing you do . . . how big the capacity of your plant . . . or how limited the floor space, there's a Worthington ammonia compressor to fit your refrigeration needs *exactly*. Worthington Corporation, Air Conditioning and Refrigeration Division, Sect. A.5.63-FE. Harrison, N.J.



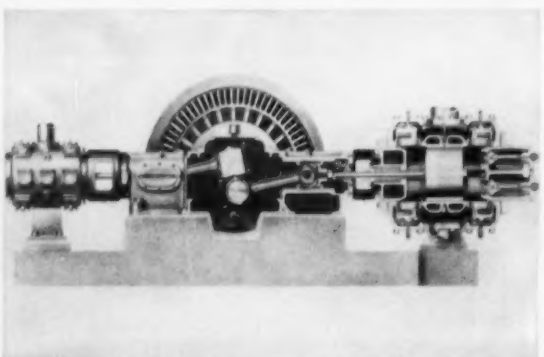
TYPE V-W HIGH-SPEED AMMONIA COMPRESSORS come with 4 and 6 cylinders in capacities from 18 to 150 tons. These lightweight, compact units can be used as high stage or booster machines. Features include famous Feather Valves® for economical operation, self-priming oil pump, balanced lightweight automotive-type pistons, cylinder liners and automatic-unload start and stop capacity control. Efficient, dependable V-W compressors are built for rugged service and long life.



VERTICAL AMMONIA COMPRESSORS (TYPE VSA) are built in capacities from 3 to 150 tons, sizes from 3 in. x 3 in. to 10 in. x 10 in. Features include patented Feather Valves on suction and discharge — lightest, tightest ever made; water jacketed cylinders, forged steel crankshafts and connecting rods; full force-feed lubrication (5 in. x 5 in. and larger).



"Y" AMMONIA COMPRESSORS are constructed for heavy duty and long, uninterrupted service. Large capacity sizes (from 60 to 460 tons) require minimum floor space — an important feature where processing machinery is concerned. For most applications, a flanged mounted motor can be used, eliminating separate motor foundation. "Y" compressors available for single or two-stage operation.



BDC COMPRESSORS are the newest addition to the line. True balanced-opposed design permits smaller, more compact foundations. Cylinders — up to four pairs — are located on opposite sides of a rugged, stable frame and powered by a double-throw crankshaft. Design is ideally suited to large multi-service or multi-stage compression requirements. Ratings from 300 to 10,000 hp. A5.63

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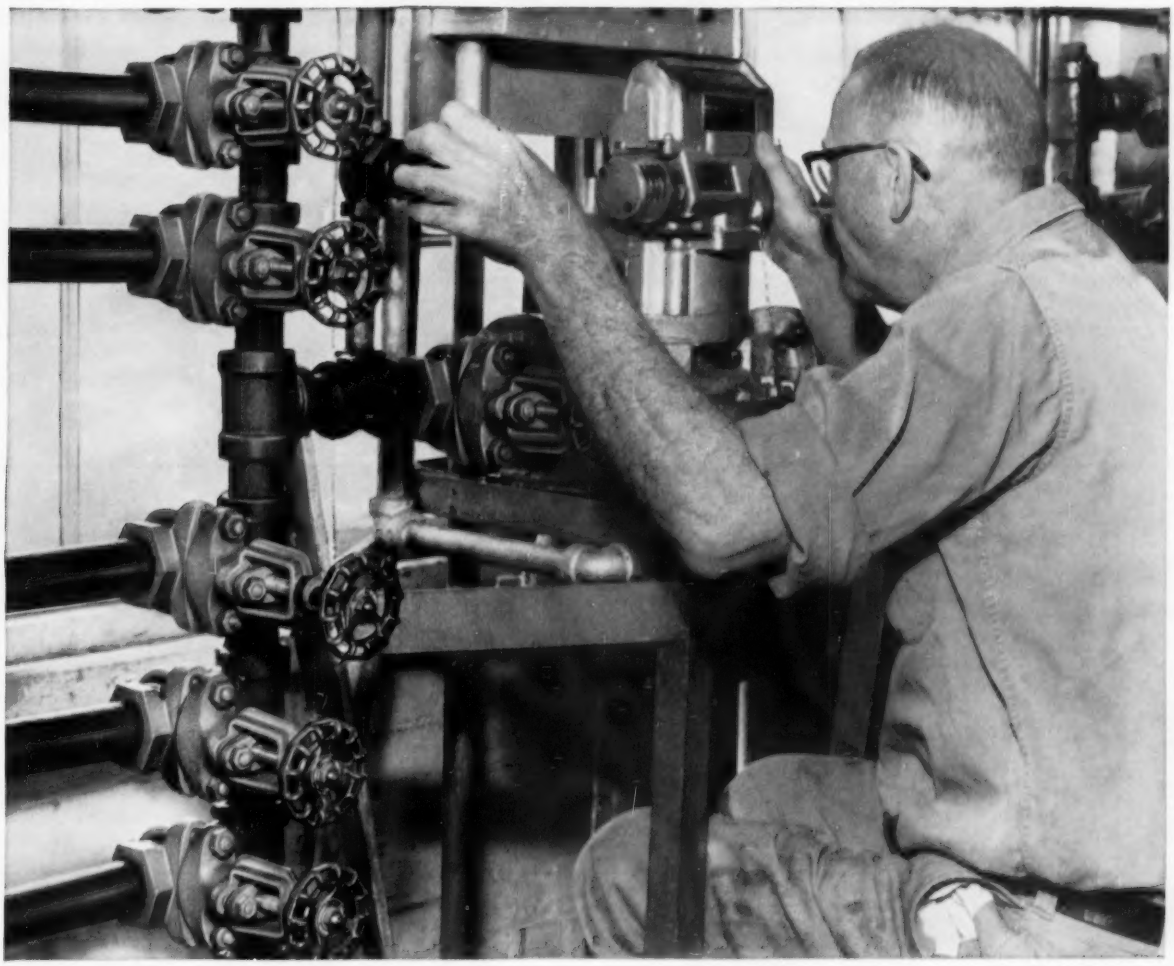

These Crane valves stay tight on soap oils and fatty acids

THE CASE HISTORY—Leakage through valve seats in raw materials supply lines posed a serious problem for Davies-Young Soap Co., Dayton—makers of various type soaps and cleaning fluids. Unwanted materials leaking past metering stations would infiltrate processing vats.

Four different makes of valves were tried before these Crane valves were installed. With all four, results were the same—seat leakage developed quickly; the valves lasted no more than 4 to 8 weeks.

Valve replacement costs were a factor on top of production losses.

The condition was remedied on installation of Crane No. 1670 Ni-Resist cast iron valves in January 1954. Eighteen months later—with no piping maintenance and no shutdowns whatsoever—the Crane valves are still holding tight. And they show no deteriorating effects from the fluids handled.

Crane Ni-Resist gates don't *look* much different from similar valves of other makes. Their difference is in properly designed, accurately finished seating of 18-8 SMo stainless steel—plus the *extra* erosion-corrosion resistance of Ni-Resist bodies and bonnets cast by Crane. Thrifty buyers know these valves have no "equal" for handling many hard-to-hold, mildly corrosive fluids.

You should have the new folder (AD2047) on these valves. Ask your Crane Representative for a copy, or write to Crane Co., General Offices, Chicago 5, Ill. Branches and Wholesalers serving all industrial areas.

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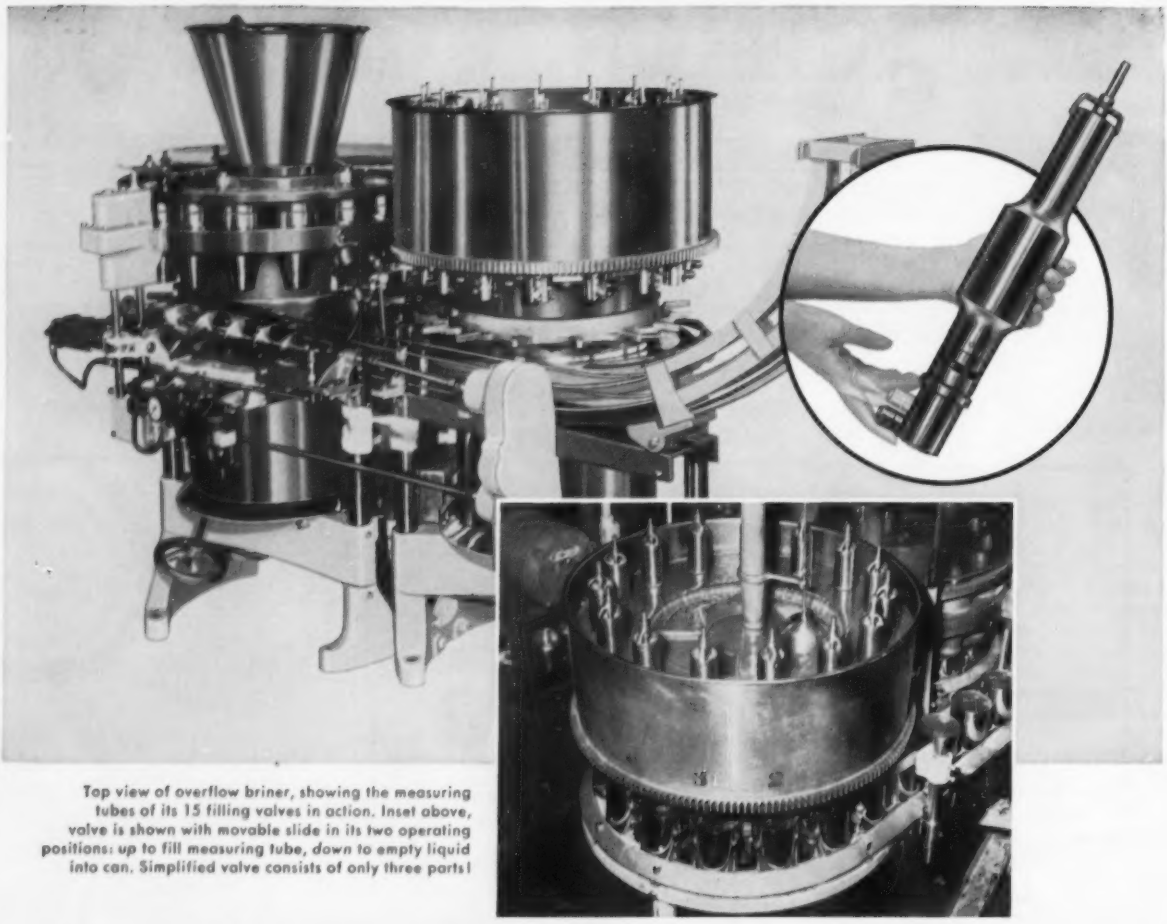

Top view of overflow briner, showing the measuring tubes of its 15 filling valves in action. Inset above, valve is shown with movable slide in its two operating positions: up to fill measuring tube, down to empty liquid into can. Simplified valve consists of only three parts!

New Filling Principle Improves Accuracy of Fill on this FMC 15 Station Filler

Long a favorite for filling and brining such products as peas, beans and whole grain corn, the famous FMC 15 Station Filler takes on a "new look" and new accuracy with the introduction of an overflow briner with simplified, two-position pre-measuring briner valves. This, plus many improvements in the product filler, combine to make it the most accurate two-in-one filler of its type. Spillage and waste of product and brine are virtually eliminated by the FMC "No can —No fill" mechanism, banked can track, smooth feed, tangential transfer and easy take-off of cans. Get full information on the many money-saving features of this truly outstanding FMC Filler.

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Lagging Public Construction — A Spreading National Blight

The most recent editorial in this series dealt with the plans of American industry for expanding and modernizing its plant and equipment over the next four years. These plans call for the expenditure of $113 billion over that period. There is a good prospect that the money to carry them out will be available. If the plans are carried out, manufacturing capacity at the end of 1958 will be double that which existed at the end of World War II. And this industrial plant will be modernized.

In sharp contrast to this picture is the condition of our *public* plant and equipment — the roads, schools, water supply, health and sanitation facilities upon which industry, as well as the average family, depends. **According to a recent estimate by the Twentieth Century Fund, the people of the United States must spend almost $100 billion on new public works projects during the next five years merely to meet the minimum needs of our growing economy.**

Other estimates by the President's Council of Economic Advisers, by state agencies and by private construction economists all show the same condition: a staggering need for public works. Yet no steps have been taken that even offer a promise of closing the gap between the public facilities we are building and the greater facilities we really need.

How did we come to let our public facilities fall into this sorry state? Here are some of the reasons:

(1) During the years of depression and war, from 1930 to 1945, these facilities were neglected. New construction declined, and even maintenance was cut.

(2) Since the end of World War II, increased construction costs have made it difficult for communities to get the needed construction with the funds budgeted in the past for that purpose.

(3) The great postwar upsurge in population, and the spreading of our population into new areas, has created a huge demand for additional community facilities before the neglect of earlier years could be made up.

Responsibility Divided

Now the need for more public construction has become apparent to everyone, on jammed highways and in over-crowded schools. But, unfortunately, the responsibility for doing something about this situation cannot be so clearly fixed as can the responsibility for maintaining industrial facilities. A business firm must expand its capacity when markets are growing or lose its trade position. It must modernize its plant and equipment or be undersold by more efficient competitors. In the case of public facil-

ities, there is no such competitive incentive. To be sure, a city or state may lose population and industries if its public facilities are inadequate. But such shifts are very slow to take place and difficult to relate to any specific public program, or lack of it.

Moreover, the responsibility for constructing public facilities is divided between state and local governments and federal authorities. Within each of these governmental units there are specialized bureaus or departments with varying responsibilities. This division of responsibility obviously adds an element of difficulty to the development of an adequate program of public construction.

Breaking the Log-Jam

How can this administrative log-jam be broken and the financial difficulties overcome?

One course would be to have the federal government step in with a nation-wide new program of direct spending on public works. That would utilize the resources of the federal treasury for immediate action. But there are weighty objections to such extensive federal participation. One is that federal spending cannot be greatly enlarged without a corresponding increase in the federal control of decisions that normally have been left to local communities. Another objection is based on the fact that so long as we must maintain a large defense establishment, such an addition to federal spending means either higher taxes or a chronically unbalanced budget.

The other course is to rely primarily on local initiative, but with new and more effective federal aid to local governments. Such aid would help speed up planning and construction, and contribute toward a solution of the most burdensome financing problems, but in amounts sufficiently limited to require that most of the capital be raised locally.

No Single Formula

No one formula can be applied to make such aid effective. The raising of funds for new schools, for example, involves problems very different from those of financing highways, or water-works, or hospitals. But it does seem clear that, in all these fields, the federal grants must be designed to stimulate more local planning and financing than has prevailed in the past. Among the new ideas that may offer such incentives are federal grants for planning and initial costs and federal guarantees of local bond issues. Such aids have been remarkably effective in the fields of slum clearance and public housing.

While the federal government clearly has a role to play, we cannot afford to postpone inauguration of an adequate public construction program while we seek a formula to apportion governmental participation that would be generally accepted as ideal. Every year about 2½ million more Americans are putting increasing pressure on a public plant already dilapidated and inadequate. The result is an increasing menace to comfort, health, education and safety. It is also an increasing menace to the effective performance of American industry.

The appropriate public response to this situation is a driving public determination to eliminate this increasingly dangerous lag in public construction. At this juncture, the development of such a determination is basic. Nothing stands in the way of an adequate program of public construction that a determined electorate cannot remove.

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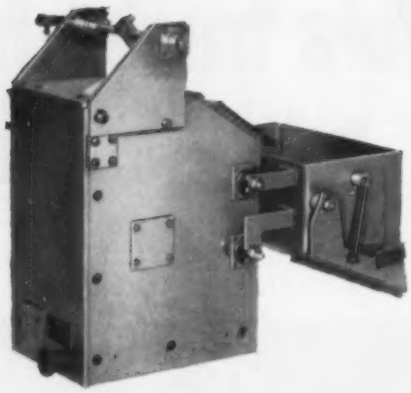

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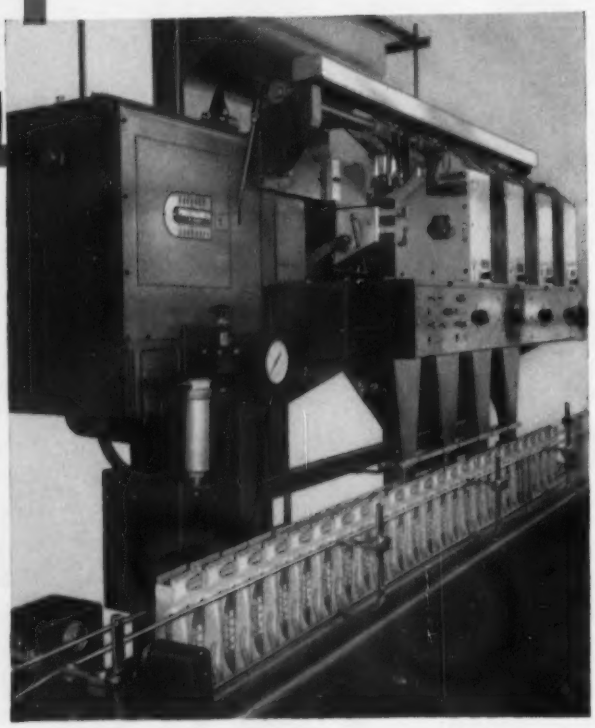

PRODUCT net weight, we mean—a highly important factor to America's volume producers of packaged goods . . . because it can, and does, have a direct bearing on net profits.

PNEUMATRON provides net weighing accuracy never before available . . . using a new instantaneous pressure principle. The Pneumatron "head" contains a highly responsive cantilever assembly which moves only a few thousandths of an inch during the weighing operation—eliminating wear and friction. An extremely sensitive control device—an air jet—instantly detects and measures the position of the weighing assembly—keeps package contents within tolerances which are remarkably close.

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PNEUMATIC ***Packaging and Bottling Equipment***

NEW EQUIPMENT & SUPPLIES

New Wine Press Employs Air-Inflated Chamber

Of interest to juice processors is a new German wine press that applies pressure through an air-inflated rubber chamber, thereby eliminating conventional piston pressing.

Advantages cited for the unit (Willmes Presser) include: Higher pressing speed, faster juice recovery, better yield, and precise pressure control. Latter avoids pressure on fruit, skins, stones, and stems to avoid bitterness in the juice.

Unit consists of a steel tank with a central rubber bag and hose connection. While chamber is deflated, tank is loaded with fruit and closed. Then, air is pumped into the hose. Inflation causes equal pressure toward the inside tank wall, which results in uniform pressing.

Presses are available in three sizes from 132 to 607-gal. capacity.—*Willmes Co., Bensheim am Berg, W. Germany.*

Circle 113A on Reader Service Card

Plant Areas Isolated By Burlap Curtain

Noisy production zones or potential fire hazards may easily be isolated with a light, retractable sound barrier.

Called Transwall, it is made of burlap and coated with flame-proofing resin. The chain-spaced curtain, supported by steel plates, operates on nylon wheels in an enclosed track. Unit is termed easily cleaned with soap or detergent.

Installation is custom-made in choice of several colors.—*Bemis Bro. Bag Co., 325 27th Ave., N.E., Minneapolis 18.*

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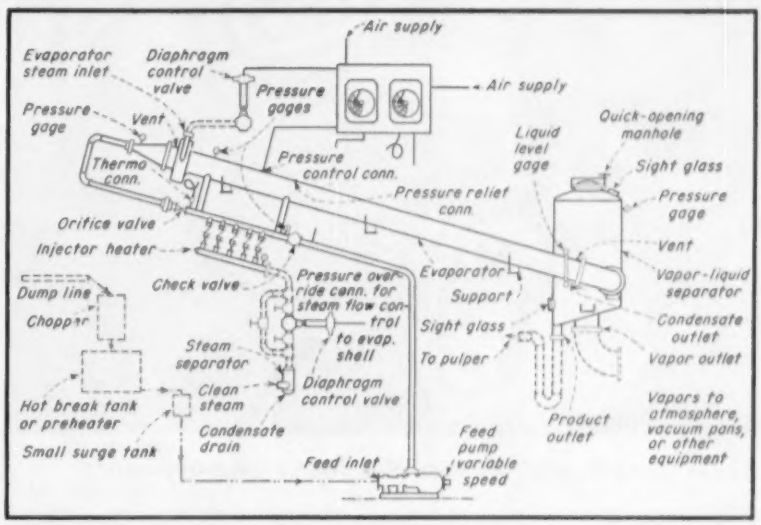


Unit Flash-Heats, Cools Tomato Pulp

For pulpy materials requiring sterilization, partial concentration, or separation, this process (Krenz Flash Break System) is said to increase yield of free-run liquor, while protecting color and aroma.

Equipment is rated at 20 tons per hr., and reportedly has increased yield of crushed tomatoes about 1%. Type 304 stainless is used on all product contact surfaces in a sanitary design that simplifies cleaning and sterilization. Furthermore, system requires space only 5 ft. wide, 40 ft. long, and 12 ft. high, and can be arranged for wall mounting.

In operation (diagram), feed enters pump fitted with variable-speed drive. Discharge passes through feed line and check valve, which prevents steam blowback from injector heater. Latter pre-heats product which flashes downstream of orifice valve through evaporator's conical entrance.

Two-phase flow then enters evaporator heat-exchange section (shell and tube) at high velocity. Time at temperature is about 10 sec. Concentrate discharges into tangential vapor-liquid separator. From here, liquid is drained or pumped, while vapor may be exhausted to atmosphere, to process stream line, or condensed. Latter arrangement, in vacuum operation, flash cools the product.

Two recording controllers insure desired operating conditions. A temperature controller throttles steam to injector heater to maintain flash temperature. And a pressure-actuated control feeds steam to shell side of evaporator. This instrument has a pressure override that closes off steam to evaporator shell should product flow stop.—*Oscar Krenz Inc., Ashby Ave. & 6th, Berkeley, Calif.*

Circle 113C on Reader Service Card

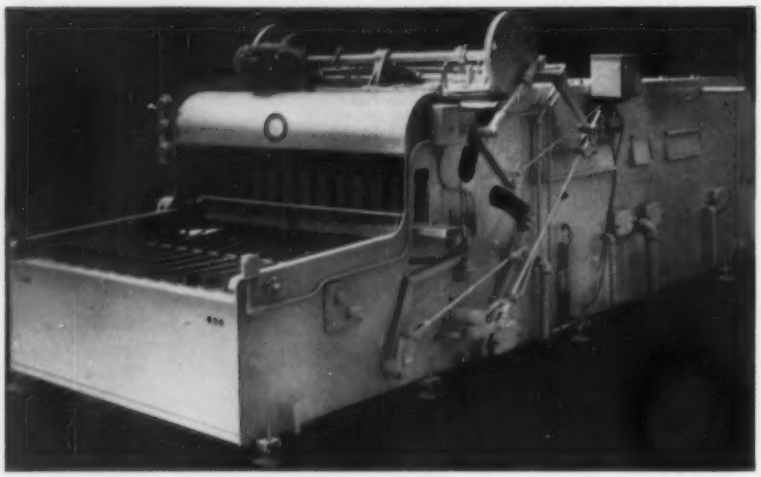
Flexible Comminutors Have Sanitary Design

Continuous size reduction and/or spray-blending of wet or dry items (with heat if needed) may be carried out efficiently in an "impact-in-air" comminutor.

Ranging in size from 3 to 300 hp., units can be tiered for multi-stage operation. Overall construction is based on sub-assemblies for accessibility and reduced maintenance, while sanitary features ease cleaning.

Components: Modular housing, rotor reversible on splined shaft for dual-purpose blades, and a spindle supported integrally with over-sized bearings seated in a line-board housing for alignment accuracy.—*The Cog Corp., 5306 W. Lawrence Ave., Chicago 30.*

Circle 113D on Reader Service Card



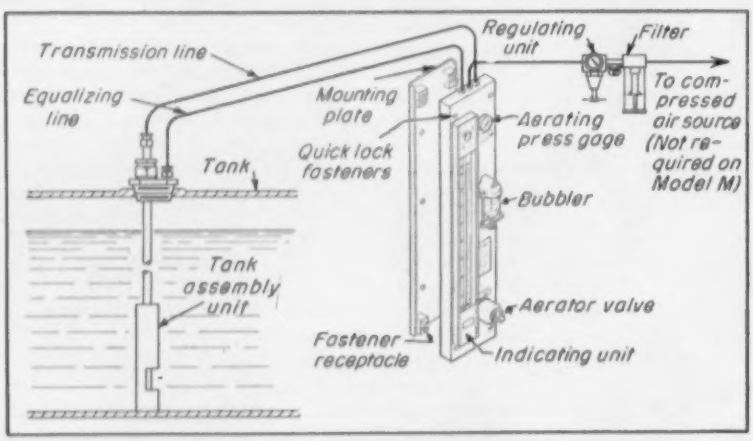
Redesigned Bottle Washer Has Many Improvements

All sizes and shapes of glass milk bottles, from oblong half-gallons to tall half-pints, may be handled in the same pockets by this improved bottle washer.

Called Model "G2Q", its pockets have been redesigned with an angular-shaped, deep-throated neck to assure proper alignment of any size bottle and eliminate wedging. Thus, full effect of spray solution and rinse water is obtained. Properly centered, bottles are discharged by push-fingers.

Shaping of pockets from neck to large end opening is said to add strength and rigidity that avoids distortion when they are assembled in an elongated rack. Other design features: Stop and loading fingers, chain tightener, simplified piping, discharge conveyor adjustment, front and rear bottle guides, leveling screws, reinforced tank structures, and knockout finger-tips.—*Cherry-Burrell Corp., 427 W. Randolph St., Chicago 6.*

Circle 114A on Reader Service Card



Remote-Reading Tank Gages Ease Processing

Four models comprise new series of remote-reading liquid depth gages, designed for convenient, rapid, installation, easy operation, and accurate indication.

Called Petrometer 1400, units are termed ideal for measuring depth and quantity of liquid in storage tanks and process vessels. They can be installed on tanks up to 50 ft. deep, located above or below ground, and up to ¼ mile away.

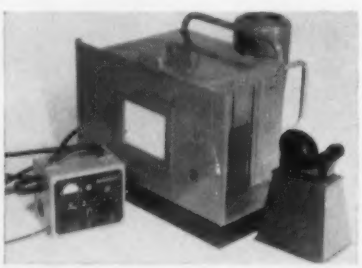
Indicators operate on the principle of hydrostatic pressure exerted by the weight of liquid in the tank. Pressure is transmitted pneumatically through a copper-tube line to the liquid column in the indicator.

Advantages cited for the system are: (1) Self-contained instrument panel —all functional parts on the panel, none on the mounting plate or as separate units, (2) indicating liquid is "sealed-in" to prevent spillage in transit and to eliminate cumbersome filling through small openings, (3) one-piece extruded aluminum indicating unit with separate channels for the scale and protective plastic window, and (4) self-aligning quick-lock fasteners and receptacles to simplify mounting of the panel to the mounting plate.

Models A, B, and F are used where a compressed-air supply is available, Model M where it is not. All models have a push-button aerator valve for transmission-line purging. In addition, Model B has a bubbler which indicates constant aeration. Purging is automatic.

Model F uses a flowmeter instead of bubbler to indicate aeration, while Model M is equipped with manual compressor and air-storage tank. Purging is accomplished by pressing the aerator button.—*Liquidepth Indicators, Inc., 43-22 Tenth St., Long Island City 1, N. Y.*

Circle 114B on Reader Service Card



Portable X-Ray Unit Offers In-Line Package Check

Offered for continuous X-ray inspection of packaged foods is a self-contained, portable fluoroscopy and radiography unit that detects metallic foreign matter.

Known as Norelco MG 60, instrument consists of three components—X-ray source, control unit, and fluoroscopy box.

X-ray unit houses the tube and high voltage and filament transformers in an oil-filled tank. Built-in air circulator cools assembly and a large handle facilitates orientation of the beam. Source is connected to control box by a flexible multi-conductor cable and plug.

Control box contains switches, signal lamps, and a milliammeter for tube current. Operation is termed simple. High voltage is controlled by a switch in steps of 5 Kvp. between

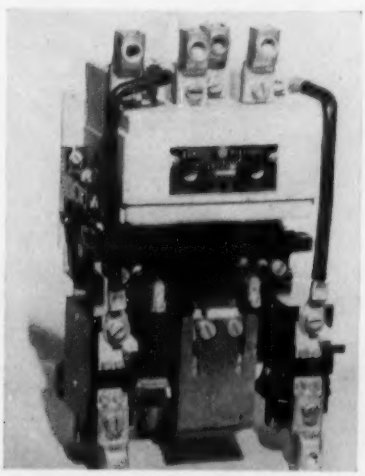
30 and 60 Kvp. Power may be turned on or off by a built-in lever switch or a remote control switch.

Fluoroscopy box eases examination of small objects. These are aranged directly behind the fluorescent screen in the front panel, and may be held stationary or moved as required. A viewing cone can be mounted in front of the screen to aid inspection in brightly lit rooms.

Apparatus complies with standard safety regulations covering radiation protection. However, when used with a conveyor belt, protective devices must be installed to prevent scattered radiation from passing through entrance and exit openings.

Unit takes power from standard 110 or 220v. a.c. supply, and current consumption is about 2 amp.—*North American Phillips Co., 750 S. Fulton Ave., Mount Vernon, N. Y.*

Circle 114C on Reader Service Card



New Magnetic Starter Is More Compact

This NEMA, vertical-lift magnetic starter, 40% smaller than previous models of the same rating, is designed for motors up to 100-hp.

Known as Size 4, it has a tough, cast-on plastic case for protection of coil windings. A permanent air gap causes the starter to drop out when de-energized regardless of age and usage. Also included is a new type of bi-metallic overload relay. Suitable for operation of polyphase motors with ratings of 220v.-50 hp. and 440/500v.-100 hp., unit is available in reversing, multi-speed and combination forms, and with either vertical or horizontal mechanical interlocks.—*General Electric Co., Schenectady 5.*

Circle 115A on Reader Service Card

Truck Body Combines Utility, Style, and Safety

This redesigned body, for mounting on forward-control type trucks, is termed suitable for all delivery purposes. In addition, a complete line of refrigerated bodies is available for delivery of perishables.

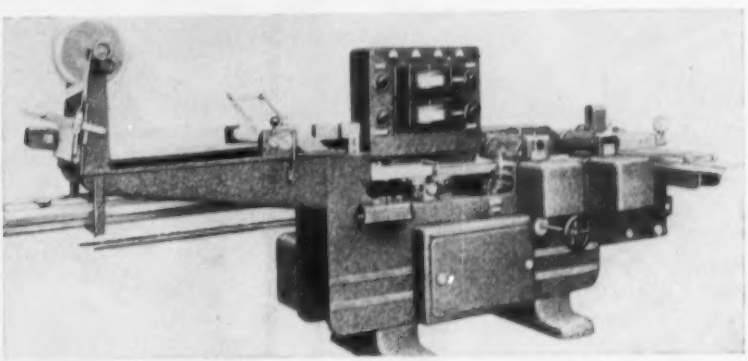
Known as Routemaster, all major components—roof, side walls, floor, front—are built as integral units, resistance welded, and then jig-assembled for precision fit. "Unitized" floor has companion return bend construction which forms its own cross members to provide an interlocking structure for maximum strength at lightest weight.

And also cited is the wrap-around safety glass windshield which eliminates corner posts so there is no interference with vision.

Roofs are lined and insulated. Side walls have horizontal panels which provide a smooth appearance suitable for painting, lettering, and advertising. Double reinforced members on interior walls furnish support which is further strengthened by rear corner posts and "pockets" for sliding side doors. Rub rails at floor level also add support and are removable for easy replacement.

Available in 8, 10 and 12 ft. lengths, units have interior width of 80 in., height 70 in.—*Herman Body Co., 4440 Clayton Ave., St. Louis 10, Mo.*

Circle 115B on Reader Service Card

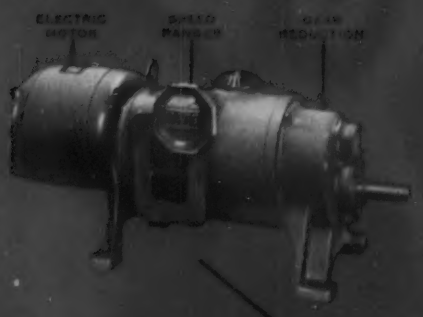


Vacuum-Packs Meat Items Rapidly, Economically

Savings in material and labor, in wrapping table-ready meats in polyethylene-coated cellophane, are offered by this vacuum-pack food wrapper (2W8 Campbell). With double vacuum head, it handles 40 packages per min., and can be quickly adjusted to varying products, shapes, sizes, and packs.

In operation, machine takes wrapping material from a parent roll and shapes it into a tube in a former. Sliced meats are grouped and manually placed on flat-top chains in an extended receiving conveyor. Product is then automatically deposited directly into tubed wrapping material.

A rotary sealer makes the fin seal. Tubing belts carry item across a folding plate to fold the fin, and then to a cutting head which tucks the sides and crimp seals about 75% of each



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end. Short belt conveyor carries partially sealed product to a cutting head which cuts wrapping material to length, and deposits semi-wrapped meat into a tucking unit.

Here, packages are placed under a vacuum chamber. Latter is lowered, air is removed, and ends are seals. After vacuum is broken, chamber is lifted and finished product is placed on a conveyor for side delivery.—*Hudson-Sharp Machine Co., Green Bay, Wis.*

Circle 115C on Reader Service Card

New Steam-Trap Design Reduces Maintenance

Need for carrying a large inventory of steam traps reportedly is eliminated by this thermodynamic unit (Sarco), used for pressures of 10 to 600 psi.

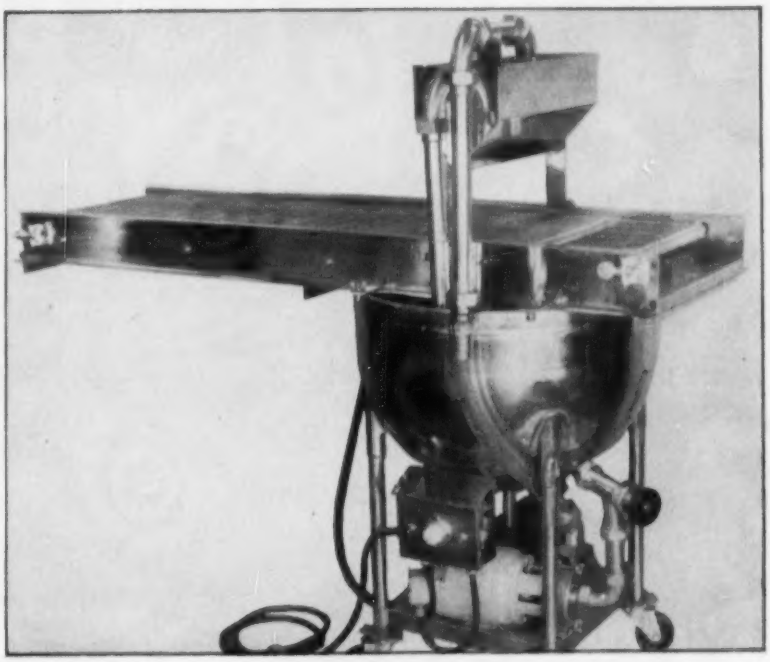
Employing energy of steam to close the valve, this trap operates equally well on light or heavy loads and closes tight on no load. It operates against back pressures up to 50% of inlet pressure.

Machined from stainless steel bar stock, unit consists of only three parts —body, screwed cap and valve head, and a solid stainless steel disk. Compact trap measures 1¾ in. x 2⅛ in. x 2¾ in.

Advanced design and all-stainless construction is said to minimize maintenance. For example, this trap has no valve closing mechanism or gasket. The one operating part is the valve head, a hardened solid disk. And stainless construction resists both internal and external corrosion.

Unit is not affected by water-hammer or vibration and is freeze-proof when installed in a vertical line with an open discharge line. It discharges at saturated steam temperature and has high air venting capacity.—*Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.*

Circle 117A on Reader Service Card



Sanitary Unit Applies Coatings, Glaze, or Icings

Efficient and economical coating of cakes, candies, and doughnuts is reported with use of an enrobing and icing unit that employs a novel heating and pumping method.

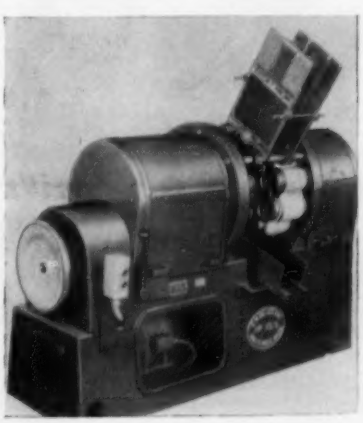
In operation, machine is plugged into an electrical outlet and placed in the regular conveyor line, or it may be operated by two men—one feeding and one removing goods to wax-papered pans. Coating capacity is 400-500 dozen units per hour, depending on product size.

The 26-in. dia. stainless kettle is water-jacketed and set on tubular legs with 4-in. casters. It has a stainless, frame-type, removable, agitator with Teflon scrapers. Water jacket is heated by two 1,000w. thermostatically controlled emersion heaters, capable of raising coating temperature to 140 F.

A stainless, channel-type conveyor is attached to kettle by studs and wing nuts for easy removal. Six foot conveyor has a 16-in. woven-metal belt powered by a gear reduction motor to speed of 6 ft. per min. Also provided, are two electrically heated drip pans.

Coating is pumped from kettle to a stainless hopper above the conveyor by a sanitary-type nickel alloy pump with 1½-in. inlet and outlet. Hopper is adjustable for height as is 4-in. bottom sheet directly below. Sanitary fittings are easily removed for cleaning.—*En-ro-bo, Inc., 231 S. LaSalle St., Chicago.*

Circle 117B on Reader Service Card



Cans Accurately Aligned In 500/Min. End Flanger

New design incorporated into this 8-station rotary double end flanger makes this unit capable of speeds in excess of 500 cans per minute.

Known as No. 1315, it has long, individually adjustable cylinder slides which provide accurate can alignment and positive flanging action. Slides allow use of small-diameter turrets that operate smoothly at high speeds. And turrets are also adjustable to permit steady, centered can flow.

Special hardened inserts are built in the cam track to increase service

NEW BLISS SCROLL SHEAR

takes bigger sheets at higher speeds

boosts your output of scroll cut strip

The larger, wider bed of this shear takes the bigger 36" x 36" sheets (allows more strips per sheet). What's more, its higher speed lets you feed more sheets; helps you step up production, step down costs. And its rugged design gives you precise, high-speed blanking year after year.

These exclusive design features tell you why: New *magnetic* feed bars assure accurate feeding (or mechanical bars for non-ferrous sheets). New intake trimming slitter makes hairline cuts. Counterbalanced slide has unusually long guides. Heavy cast Meehanite frame is one-piece construction for the extra rigidity that makes your dies last longer.

Identified as No. 1100, this new shear is *one more example* of what you can expect from Bliss' new Hastings (Mich.) can plant. It's *one more reason* to keep your eyes on Bliss can machinery. Meanwhile, why not write for more information about this shear. We'll be glad to send it by return mail. Write to:

E. W. Bliss Company
General Sales Office: 50 Church Street, New York 7, N. Y.

WHY YOU GET LONG SERVICE LIFE...

- slitter shafts mounted in anti-friction bearings
- air friction brake and clutch for fast engagement, quick release
- automatic lubrication and underslung drive—no oil-spoiled sheets

AND EASY OPERATION TOO!

- electric pushbuttons for safe, quick control
- automatic or hand feeds to suit your application
- easy access to stacker

BLISS
SINCE 1857

is more than a name . . . it's a guarantee

BLISS CAN AND CONTAINER MAKING MACHINERY

SLITTERS

BODYMAKERS

FLANGERS

SEAMERS

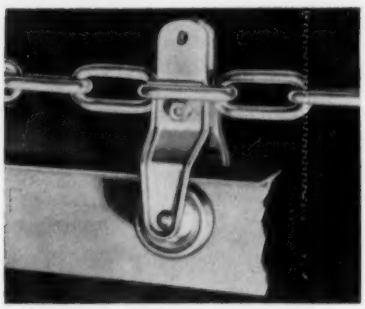
TESTERS

STRIP FEED PRESSES

life, and heavy box-type base is made of cast Meehanite to reduce vibration. Built for sustained, automatic operation at high speeds, equipment handles can sizes from 2 in. to 4⅞ in. dia., and from 2 in. to 8 in. tall. Furthermore, adjustments for changing can sizes are said to be easily made.

Units has adjustable rollers and variable pitch sheaves, and is protected against jams in other parts of the line by interlocked safety switches—*E. W. Bliss Co., 50 Church St., New York City.*

Circle 117C on Reader Service Card



Trolley Conveyor Eases Materials Handling

This lighter-duty overhead trolley conveyor is designed for moving and storing any suitable load of average weight.

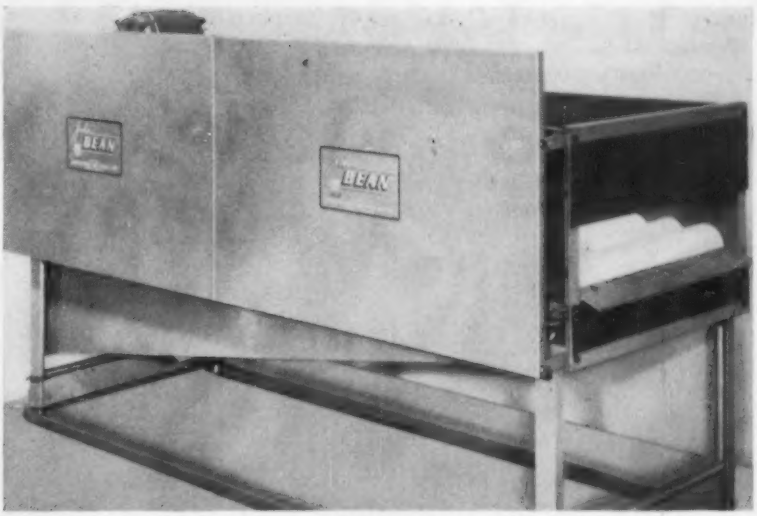
Called A-F "Trol-E-Veyor", unit is available for either welded or bolted assembly. Trolleys are normally spaced at 8 in., 12 in., 16 in. or 20 in. centers. They can be quickly and easily moved from one space to another by removal of a single bolt without disturbing turn or drive sprockets.

Two capacities are offered—a 40-lb. trolley, with single-race bearing wheels, and an 80-lb. double-race unit. Heavier loads are accommodated by installation of load bars between trolleys.

Chain of this conveyor system is case-hardened for wear resistance and bright zinc-plated for corrosion resistance. Ultimate strength of the chain is 6,000 lb., with a yield point of 4,000 lb. In operation, however, chain pull is limited to 600 lb. to provide longer life and ample safety factor. Various ranges of speeds are available, from .8 fpm. to 60 fpm.

Flexible systems, which allow for steep inclines and short radii of horizontal turns and vertical curves, are said to require minimum of superstructure.—*Alvey-Ferguson Co., Cincinnati 9, Ohio.*

Circle 119A on Reader Service Card



Unit Scrubs Potatoes, Removes Excess Water

This 18-roll potato-washer-absorber (Grabill) is designed to produce a clean, bruised-free pack. And it fits compactly into any packing line.

Ten washing brushes, with long pintle rubber tips, scrub potatoes thoroughly under a continuous water spray from overhead nozzles. When rinsed, spuds pass over 8 absorbing rolls. These are covered with sponge-rubber and canvas, and wrapped in inexpensive replaceable toweling to remove excess water.

Units, available in 18, 30 and 42-in. widths, are driven by independent motors and require only normal water pressures. For faster drying, the 30- and 42-in. models can be used with maker's warm-air dryer.—*John Bean Div., Food Machinery & Chemical Corp., Lansing 4, Mich.*

Circle 119B on Reader Service Card

Glass Blocks Combine Insulation and Finish

With these cellular glass blocks, which combine insulation and ceramic finish in a single unit, a completely insulated and surface-finished wall can be erected in one operation. And no finish coating is required to protect the insulation.

Called "Duraface Foamglas", new material provides a durable impact-resistant surface along with high insulating and moisture-proof qualities. Unsupported walls can be built with blocks because of their rigidity and high compressive strength. In addition, they can be washed to maintain sanitary conditions in refrigerated food storage and processing areas.

Blocks are made in a standard size, 18 in. x 12 in., and in thicknesses of 3 and 4 in. They are installed by dipping in hot asphalt or a cold adhesive and pressing on the wall. Units are made of glass having diffused air cells. The ceramic surface has smaller cells for greater density which prevents cracking or peeling.—*Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22.*

Circle 119C on Reader Service Card

Want More Information–

It's free—and easy to get. Simply note here the items on which you want more details, then circle each key number (there's one given at the bottom of each item) on the handy Reader Service postcard—back of book. Then sign at the bottom and mail.

For your convenience, too, items in this department are listed and keyed in the Reader Service Section.

Staley's ® PRODUCTS FOR BETTER FOOD PROCESSING

Zest steps-up sales with Better Flavor

Zest protects tasty goodness during heat and pressure cooking . . . gives your products Full Flavor Appeal!

More and more food processors are turning to Zest MSG to insure fresher, tastier goodness in canned and frozen foods. And it's no wonder, because Zest *never lets a flavor fade*, even under extreme steam table conditions! Even during cooking, when heat and pressure are most likely to rob your products of delicious natural flavor, you can depend on Zest to fortify and enhance fresh, natural food flavors. Zest adds no taste, color or aroma of its own . . . it brings out the desirable flavors already present. Zest is easy to use, just add it like salt. Start now to step-up your sales with better flavor by using Zest. See your Staley representative or write today for details.

PRODUCTS FROM CORN
Staley's
AND SOYBEANS

OTHER QUALITY PRODUCTS
Sweetose® Syrup
Regular, Intermediate Corn Syrups
Soy Flours • Starches
Corn and Soybean Oils

STALEY'S 99% PURE **Zest®** MONOSODIUM GLUTAMATE

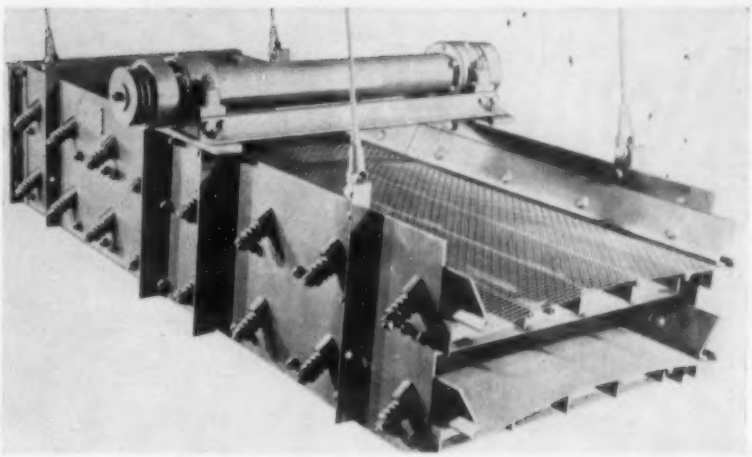
A. E. Staley Manufacturing Company, Decatur, Illinois

Filter Operation Improved By Treated Cotton Cloth

Resistance to common chemicals, mildew, wrinkling, and shrinkage are advantages cited for a treated cotton filter cloth.

Called Type "M", it is recommended for use on plate and frame filter presses and on rotary vacuum filters where easy cake release and dimensional stability are important operating factors. Available in a variety of weaves, this material is also termed suitable as a dust-collection fabric. —*National Filter Media Corp., 1717 Dixwell Ave., New Haven 14, Conn.*

Circle 121A on Reader Service Card



New Vibrating Screen Has Numerous Applications

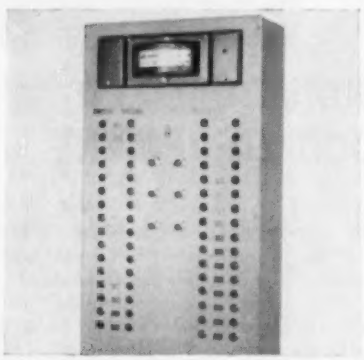
Designed to handle a wide variety of materials, this screen uses a simplified two-bearing design with counterweight wheels and sturdy bolted construction.

Known as "Aero-Vibe" (Model AVS), it makes separations of from 1¼ in. to 35 mesh. Applications include separating solid foreign particles from liquid and solutions, thickening, dewatering, and stream pollution reduction.

The screen's self-contained saddle-mounted mechanisms can be conveniently inspected, lubricated, or removed. Body is constructed of rolled steel with heavy channel cross members and rigid diagonal braces. Longitudinal members are replaceable with lock nuts.

Unit is available in suspended or floor-mounted models, frame-mounted for portability, and semi or totally enclosed, with one, two or three decks in sizes 3x6 ft. to 4x10 ft.—*Allis-Chalmers Mfg. Co., 1113 S. 70th St., Milwaukee.*

Circle 121C on Reader Service Card



Temperatures Checked By Automatic Scanner

Multiple temperatures may be automatically monitored with a scanner-type unit, called Control Center. Applications include process operations and continuous checking of bearing temperatures of pumps, turbines, and motors.

Scanner comprises a Multronic Capacitrol (Wheelco Model 245P), pilot lights, pulse-actuated stepping switch, pulsing timer, and holding relays. Temperature at each control station is read in a fixed time interval—32 stations in 2 min. A pilot light indicates the checked point.

Should any station be "off limits", visual and audible alarm is given. Amount of correction needed at any point is visually indicated and a manual reset switch clears alarm indication after temperature corrections have been made. Also included is a pulsing push-button switch for manually checking any of the temperature points.

Overall dimensions are 2 ft. x 6 ft. x 13 in.—*Wheelco Instruments Div., Barber-Colman Co., 1300 Rock St., Rockford, Ill.*

Circle 121B on Reader Service Card

Grain Infestation Spotted By Compact X-Ray Unit

Developed for use by unskilled personnel, a new inspection unit (Gixu) handles two 100-g grain samples.

Exposure cabinet (21 x 21¾ x 31½ in.) is made of sheet steel with large door for easy access. Movable interior shelf and brackets support film and grain holders at various levels, and exposure stops if door is opened.

Tube head consists of a shock-proof protective housing containing high-tension and filament transformers, and a beryllium window x-ray tube. These are immersed in insulating oil to form a single sealed unit. Removable tube head weighs 49 lb., and equipment operates on 60-cycle, 115 v. a.c., single phase.—*Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30.*

Circle 121D on Reader Service Card

Wall Surfaces Protected By Sprayed-Plastic Film

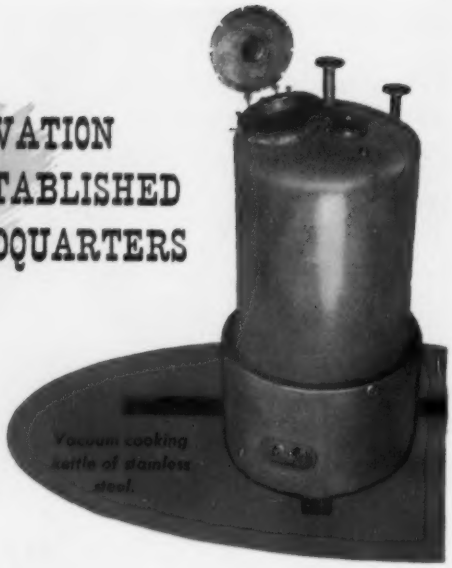
This vinyl plastic spray bonds directly to cinder and concrete blocks, cement, or plaster to protect surfaces from physical wear, water vapor, chemical fumes, and cracks.

Known as Plastispray, it forms a pliable sheet of high tensile strength and elongation, and provides a continuous surface not impaired by joints or seams. Washable coating, available in any color, varies in thickness up to ⅛ in., depending on performance requirements.—*Liquid Plastics Corp., 50-02 23rd St., L. I. C. 1, N. Y.*

Circle 121E on Reader Service Card

BACK IN THE 1880's

WHEN THE SALVATION ARMY FIRST ESTABLISHED AMERICAN HEADQUARTERS



Vacuum cooking kettle of stainless steel.

Koven

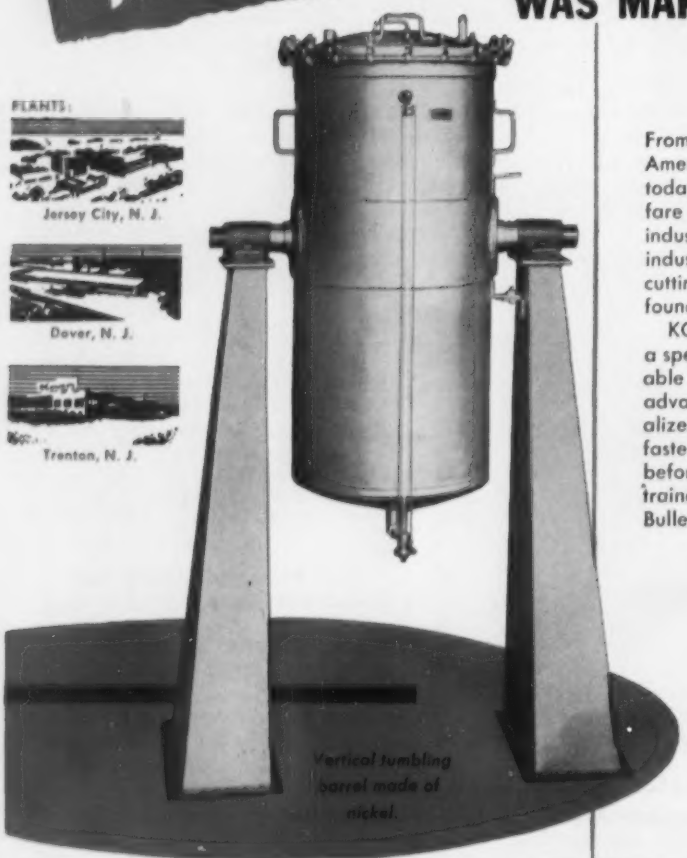
WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT

PLANTS:

Jersey City, N. J.

Dover, N. J.

Trenton, N. J.



Vertical tumbling barrel made of nickel.

From a small band of only eight men and women, the American branch of the Salvation Army has grown until today, it is one of our largest and best known social welfare organizations. During this same period, the food industry also had made great progress—aided by such industrial pioneers as L. O. KOVEN—makers of the cost-cutting individualized food equipment, today as then, found in leading food plants throughout the country.

KOVEN-built equipment is tailored to meet the needs of a specific operation. Each unit is as efficient and dependable as over 70 years accumulated skill plus the most advanced techniques can make it. Install KOVEN Individualized Equipment and see how it helps your plant achieve faster production—more economical output than ever before. Call or write today for a consultation with a trained KOVEN representative. No obligation. Send for Bulletin #550.

Specialists in intricate fabrication using:

- **stainless steel**
- **monel**
- **nickel**
- **aluminum**
- **inconel**
- **all clad materials**

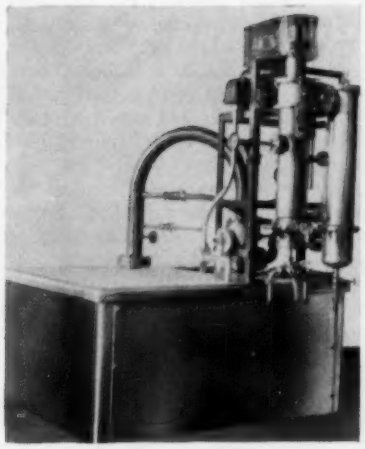
Fabrication to all A.S.M.E. Codes

X-Ray Inspection **FOR QUALITY CONTROL**

KOVEN equipment in all metals and alloys includes: High pressure vessels, extractors, mixers, stills, kettles, tanks, stacks, breechings. Shop and field erected storage tanks to 2 million gallons. High vacuum testing.

L. O. KOVEN & BRO., INC.
154-D Ogden Ave., Jersey City 7, N. J.

KOVEN FOR INDIVIDUALIZED EQUIPMENT SINCE 1881



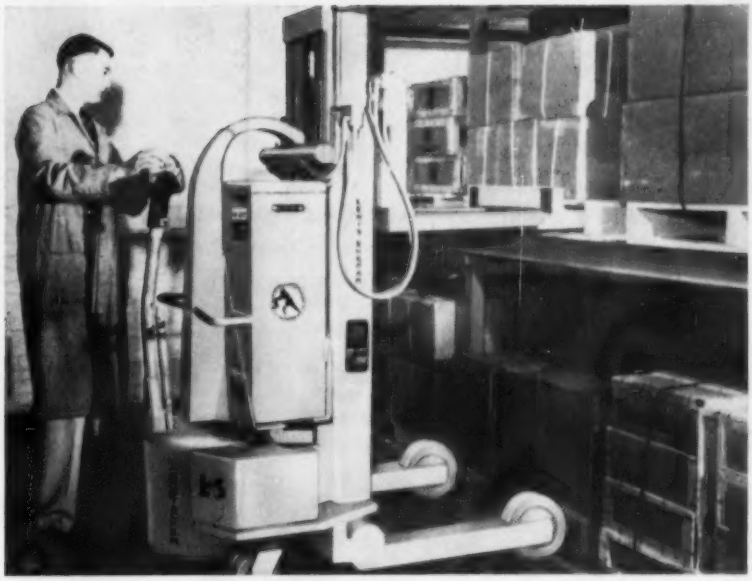
Process Factors Studied In Lab-Size Evaporator

Unit operations such as evaporation, single-step distillation, deordorization, heating, or cooling of heat-sensitive items, may now be studied in a portable laboratory evaporator that uses the agitated film principle. Heat transfer area is 1 sq. ft.

Called Turba-Film, unit is built of 316 stainless throughout and designed for heating mediums up to 250 psig. and 700 F. Condenser is a vapor-in-tube unit that operates with cooling water at 60 F. Auxiliary facilities can also be provided for 34-F. water.

A variable-speed drive permits change of rotor speed as required. Evaporator is available as individual unit with stand, with auxiliary condensing equipment, or as complete packaged plant including vacuum equipment, feed pumps, discharge pumps, and instruments.—*Rodney Hunt Machine Co., Orange, Mass.*

Circle 123A on Reader Service Card



New Tiering Truck Operates in Narrow Aisles

A "walkie" type electric tiering truck, equipped with hydraulically extendable forks, handles 48-in. long loads weighing 3,000 lb. in aisles measuring only 67 in.

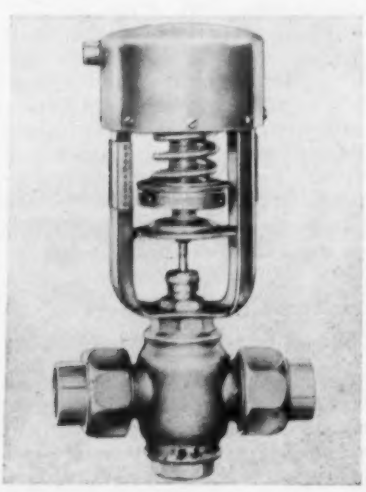
Called HydraFork, unit does not straddle loads. To pick up a load, operator simply positions truck, extends forks into pallet, lifts load in pallet over wheels and retracts it into truck. To place load in storage racks, he extends forks and load, and drops pallet into empty space.

Equipped with large 10-in. dia. x 5 in. face rubber-tired load wheels, truck handles pallets of any width and can be used to reduce aisles in warehouses, which have been laid out for counter-balanced fork truck, with no change required in either the racks or pallets.

Use of rubber-tired load wheels in the design of this truck reportedly offers the best possible protection for a plant's floor.

Available in either 2,000 lb. or 3,000 lb. capacity, units have two speeds, forward and reverse. Hydraulically actuated stroke of fork is 24 in. For additional savings in aisle space all controls—power lift and lowering, brake, horn, and directional interlock —are located in handle head of truck. Control handle operates in any position, including vertical.—*Lewis-Shepard Products, 125 Walnut St., Watertown, Mass.*

Circle 123B on Reader Service Card



All-Metal Motor Valve Has Wide Application

For hydraulic and pneumatic control systems, this all-metal motor valve is said to have superior modulating characteristics.

Equipped with large 10-in. dia. x steel spring and 2-ply seamless metal bellows, unit (No. 992-D) controls flow of steam, gases, and liquids. As a final control element, it maintains pressure, temperature, or liquid level. Valves are available in sizes from ¼-4 in. in a variety of types, either direct or reverse acting.—*Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville 1, Tenn.*

Circle 123C on Reader Service Card

Portable Compressor Ups Plant Flexibility

Offering high capacity in a compact package is a portable 125-hp., electric-driven air compressor, whose installation is said to require a minimum of foundation, time, and labor.

Day after Day...

more and more nationally famous products are packaged on the

Automatic **CAMPBELL WRAPPER**

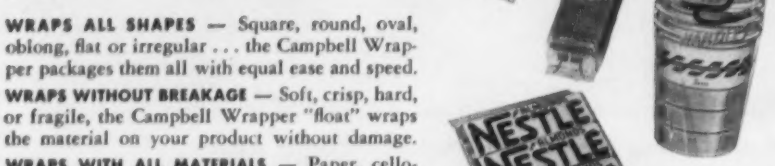
WRAPS ALL SHAPES — Square, round, oval, oblong, flat or irregular . . . the Campbell Wrapper packages them all with equal ease and speed.

WRAPS WITHOUT BREAKAGE — Soft, crisp, hard, or fragile, the Campbell Wrapper "float" wraps the material on your product without damage.

WRAPS WITH ALL MATERIALS — Paper, cellophane, polyethylene, foils and all types of the plastic film packaging wraps so popular today.

POSITIVE SEALING — By gluing, crimping or heat sealing with ends flared, turned under or diamond folded. The Campbell Wrapper is now also available for positive VACUUM Wrapping.

AUTOMATIC FEEDS — and deliveries provide continuous flow packaging geared to coincide with in-line production manufacture or separate operation. Write for complete details and send us a sample of your product.



Speeds Production
. . . wraps up to 300 units per minute!

Cuts Labor Costs
. . . simplified one person operation!

Saves Materials
. . . uses no boards or stiffeners— unless desired!

Campbell
WRAPPER
HUDSON-SHARP MACHINE CO. • GREEN BAY, WIS.
Manufacturers of Aniline and Gravure Presses, Folders, Interfolders, Laminators, Waxers, Embossers, Slitters, Sheeters, Roll Winders, Packaging Machines, Crepers and Tissue Converting Units.

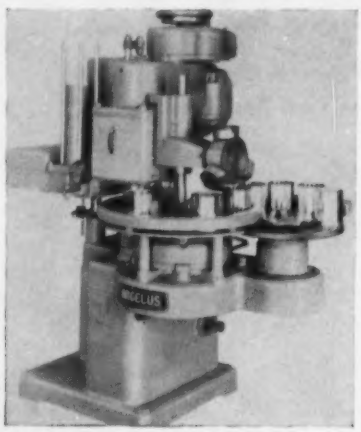
Write for full colored 16-page brochure telling all about the Campbell Wrappers and the many different types of products they package.

Equipment & Supplies

Standard air cooled, 2-stage unit (Type 40, 80-125 psi.) has single-core horizontal-flow intercooler, new shrouding, forced-feed lubrication, full free-air unloading, and new-type channel valve. Special model delivers 120-200 psi.

Either constant-speed control or dual control can be furnished. Latter is available with either automatic or manual selections for operation at constant-speed or automatic start-and-stop.—*Ingersoll-Rand Co., 11 Broadway, New York City.*

Circle 123D on Reader Service Card



Automatic Seamer Offers Operational Flexibility

This all-purpose, low-cost automatic seamer reportedly fills the needs of the smaller canner—particularly those having a large number of changeovers or short runs.

Designated Model 10P (Angelus), it has a speed range of 30 to 85 cans per min., and handles can diameter sizes from 2⅛ to 4¼ in. Unit is suitable for either solids or liquids.

Flexibility is seen in the small number of parts required for can size change, which minimizes original inventory investment and reduces change-over time. Accessories include steam-injection vacuum attachments, variable speed drives and rotary topper.—*Angelus Sanitary Can Machine Co., 4900 Pacific Blvd., Los Angeles.*

Circle 124A on Reader Service Card

Plastic-Coated Papers Guard Food Quality

Superior protective properties are reported for a packaging material made of a film of polyethylene bonded to one or both sides of a sheet of paper —tissue to heavy bond. (Turn page)

Yours for the asking

There's no sense in even *trying* to be an expert in *all* phases of manufacturing today. And there's no need to. For your specialized motor problems, you can turn to Leland's competent sales and design engineers – experts you can "add to your staff" *for the asking.*

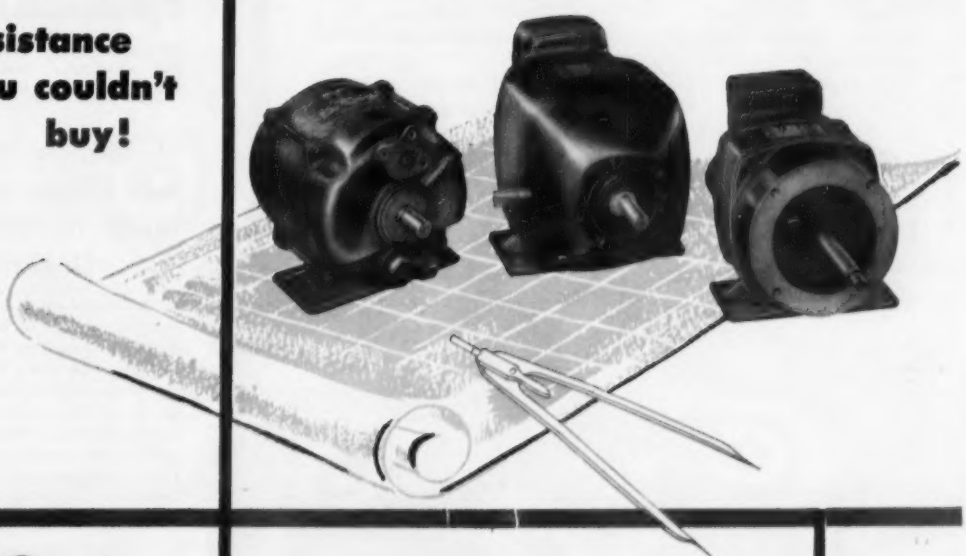
With years of practical experience in serving manufacturers, and a finger-tip knowledge of Leland designs and applications, our representatives can often give you an immediate recommendation. They may confer with our capable staff of skilled design engineers. Often, the design engineer will wish to discuss the problem directly with you, to obtain all the pertinent data needed for a thoroughly practicable solution.

For more than 30 years, Leland has been a leader in the design and manufacture of unusual motor items. And though it has been a constant challenge, sometimes a seemingly impossible one, the reward has been the regularity with which Leland has come up with the answer.

Today, the complete line of Leland motors, standard or special, reflects the wealth of design know-how acquired through developing units for so many widely diversified applications.

Try Leland on *your* motor requirements, from ⅛ to 5 hp. Profit from Leland's experience and the in-built quality of its standard motors. Or consult our representatives in principal cities about your *special* motor problems. Add a real specialist to your staff.

Design assistance you couldn't buy!



Another AMF Product

LELAND MOTORS

THE LELAND ELECTRIC COMPANY
Division of American Machine & Foundry Company
Dayton 1, Ohio

Visit Leland at Booth 349
Production Engineering Show
Navy Pier, Chicago, September 6-16

For more information, use coupon on last page.

The new Six-Wheeler has 181½" wheelbase, 250A Mustang Engine, 507B transmission, SBD1555 tandem axle, ratios 5.57-6.80. Tire size 10.00x20. Air brakes. Body is 22 ft. long, 7 ft. high.

Payloads Going UP! Delivery Costs DOWN!

with WHITE 3000 Fleet

YOU CAN do more work with a WHITE 3000!

Look at the record of Burg Trucking Corp., New York—with their modern fleet of Whites.

Operating in heavy-traffic areas, President Morris Burg wanted to go to bigger delivery units, but did not want to sacrifice on maneuverability and driving ease.

On new White Six-Wheelers body length was increased to 22 ft. for substantial boost in capacity—nearly 3 ft. longer without increasing overall length. "We handle more payload—more deliveries—with substantially the same operating costs," Mr. Burg says.

THE WHITE MOTOR COMPANY • *Cleveland 1, Ohio*

Morris Burg, President
Burg Trucking Corp.
New York City

Michael Cohen, Manager
Food Fair Stores, Inc.
Meat Packing Division
Elizabeth, N. J.

Modern Six-Wheelers Add Efficiency to BURG TRUCKING Corp. Operations

MODERN methods of meat handling and distribution include the White 3000 as used by Burg Trucking Corp. for Food Fair Stores and from New York's Washington Market rail heads and slaughter houses to wholesalers and chain warehouses in Greater New York, Albany, Philadelphia and many points in New Jersey.

Burg Trucking Corp. has been using Whites since 1944 . . . now has a modern fleet of 40 units, 26 of which are White 3000's.

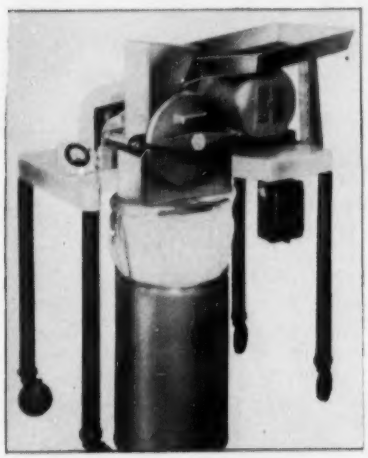
Aluminum body is specially insulated with reinforced roof and floors. Overhead rails handle carcass meat on hooks. Below 30° temperature.

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Equipment & Supplies

Known as Poly Paper (Crown), it is impervious to water, remains tough and flexible at high and low temperatures, and provides a vapor barrier under all conditions of use. In addition, the coated paper resists attack by acids, alkalies, solvents, greases and oils.—*Crown Zellerbach Corp., 343 Sansome St., San Francisco.*

Circle 124B on Reader Service Card



Multi-Grind Pulverizer Is Quickly Cleaned

Developed to insure product purity, this multi-grind pulverizer (Mikro-Multi-D) operates in the 4 to 20 mesh range with precise particle control.

Also cited is the unit's ease and speed of cleaning. Tests show that it can be disassembled and reassembled in less than 2 min. Although cleaning time varies with nature of material, entire job can be handled in less than 14 min.

Use of a variable speed drive permits easy altering of hammer speed for quick change of particle size. All parts in contact with material being processed are 18-8 stainless—feed tables, entire mill body, rotor shaft, hammer assembly, cover plates, and parts inside mill. Construction couples lightness with durability.

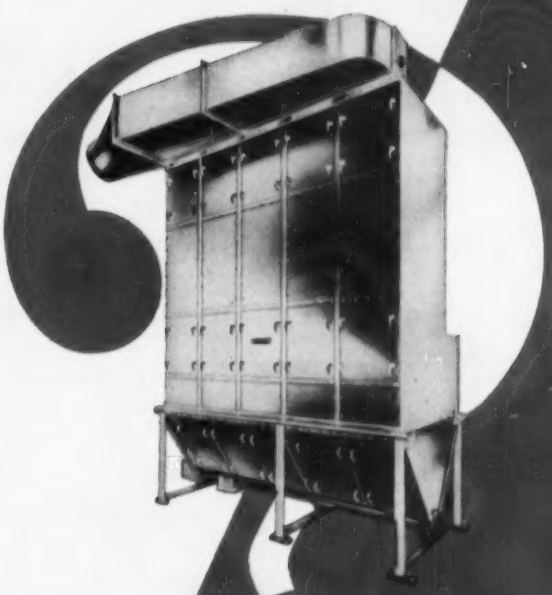
Unit is powered with either a 3 or 5 hp. motor depending upon desired capacities, which range from 500 to 2,000 lb. per hr. on average materials. Slow rotor speed and coarseness of grind keeps operation cool. Weighing about 200 lb., machine requires floor space of 2 ft. x 3½ ft., and is offered with motor, base, and casters.—*Pulverizing Machinery Div., Metals Disintegrating Co., 153 Chatham Rd., Summit, N. J.*

Circle 127A on Reader Service Card

"DO-IT-YOURSELF" or "TURN-KEY" job ? ? ?

an ENTOLETER DIVISION designed system solves dust collection problems either way . . .

Our engineering staff will specify the Simon Suction Filter Dust Collector to meet your mill requirements . . . ship you the parts and installation instructions and you can "DO-IT-YOURSELF"! All parts are jig-drilled and tapped to facilitate assembly . . . or dismantling should future requirements dictate its relocation.



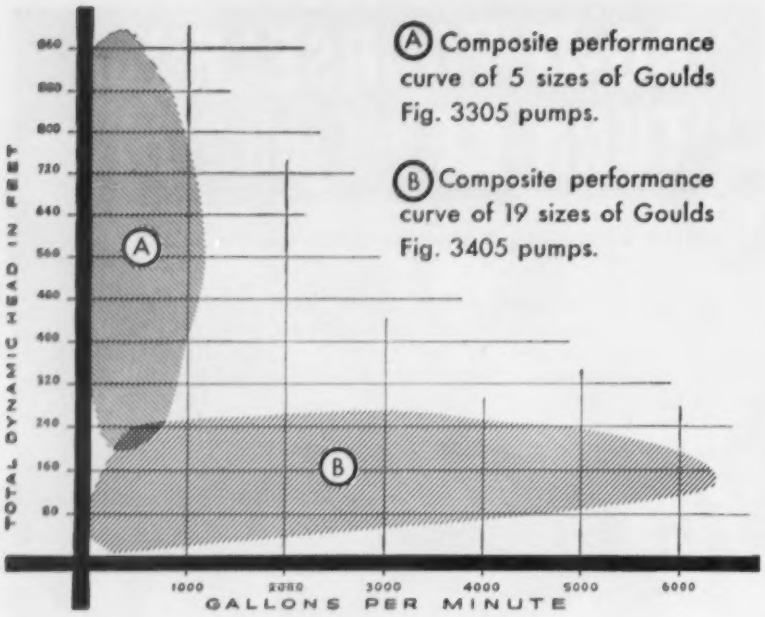
OR. . .

Our engineering staff will design a "turn-key" dust collecting system incorporating a Simon Suction Filter Dust Collector, tailored to your specific requirements . . . contract and supervise its complete installation . . . relieving you of all details until it's time to pull the "ON" switch.

Regardless of which method solves your dust collecting problem . . . the all aluminum SIMON SUCTION FILTER DUST COLLECTOR is the answer. It has been redesigned and streamlined to keep in step with modern food processing . . . contains the greatest filtering area per square foot of floor space . . . operates with high air to cloth ratio . . . positive air flow . . . low power requirements . . . IT IS YOUR BEST BUY IN DUST COLLECTING EQUIPMENT!

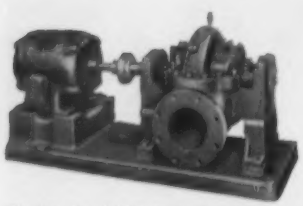
ENTOLETER DIVISION
The Safety Car Heating & Lighting Company, Inc.
1187 Dixwell Ave., New Haven 4, Connecticut

For more information, use coupon on last page.

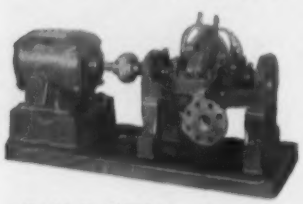


Do you need **pumping capacity?**

. . . or head? . . . or both?



Goulds Fig. 3405 single-stage pump.



Goulds Fig. 3305 two-stage pump.

With these two groups of Goulds centrifugal pumps you can meet an extremely wide range of pumping requirements.

For volume pumping, 19 sizes of the Fig. 3405 single-stage, double-suction pump provide capacities up to 6,400 GPM, and heads to 280 ft.

For greater pressure requirements 5 sizes of the Fig. 3305 two-stage pump provide heads up to 1,000 ft., and capacities to 1,200 GPM.

Both of these groups of pumps have important new design and construction features that insure efficient operation and long life. Yet, because so many of their parts are interchangeable, *you can cut your parts inventory in two—or better.*

For example, you need only 3 different shafts for all 24 sizes of pumps in both groups.

We'd like to send you additional details about these pumps, including specifications and performance curves. Just write for Bulletin 721.6 about the Fig. 3405 single-stage pumps, and Bulletin 722.6 about the Fig. 3305 two-stage pumps. We'll be glad to send you copies of both.

MEMBER

Goulds PUMPS INC. Seneca Falls New York

ATLANTA • BOSTON • CHICAGO • HOUSTON • NEW YORK • PHILADELPHIA • PITTSBURGH • TULSA

Equipment & Supplies

Vacuum-Operated Unit Lifts Heavy Objects

This dual-pad vacuum lifter, designed for use with chain hoists or lift trucks, has a raising power of 2,000 lb.

Called Vac-U-Lift, unit is powered by a heavy-duty, fan-cooled, continuous-operating vacuum pump (28 in. maximum vacuum). In operation, it is lowered into position over the piece to be lifted and suction is switched on. This connects the object with no danger of dropping or slipping.

After moving, piece is detached by breaking the vacuum.—*International Staple & Machine Co., 801 E. Herrin, Herrin, Ill.*

Circle 128A on Reader Service Card

Stair-Climbing Handtruck Has Cable Drive, Brakes

This unit is said to safely double the load a man can roll up steps, while tripling that moved down stairs or ramps. (Turn page)

Is she opening your margarine?

SODIUM BENZOATE PREVENTS FOOD SPOILAGE

Spoiled margarine not only costs plenty of money . . . it can ruin your reputation! Make *completely sure* of product freshness with Sodium Benzoate. This dependable preservative prevents spoilage by controlling the growth of yeast, mold and bacteria that cause it. And Sodium Benzoate is the cheapest insurance you can buy. Only a fraction of one per cent in margarine is enough to give your product *months* of freshness! Refrigeration and quick delivery do the job, too. But you need more. Remember, customers won't take a second chance on spoiled margarine. Don't *you* take the first. Insure freshness *completely*—with Sodium Benzoate!

Organic Chemicals Division
MONSANTO CHEMICAL COMPANY
Box 478-G-5, St. Louis 1, Missouri

MONSANTO

SERVING INDUSTRY . . . WHICH SERVES MANKIND

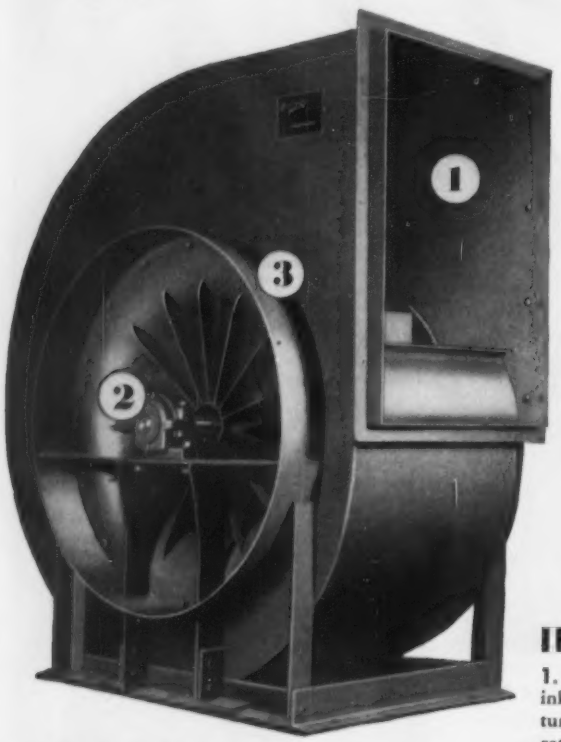
ONE POUND PROTECTS 1000 POUNDS!
Most perishable foods require only 0.1% Sodium Benzoate to insure freshness for months. Thus one pound of Sodium Benzoate—costing only 46¢*—is enough to protect 1000 pounds of margarine. It's the most economical protection on the market! *Subject to change without notice.

For more information, use coupon on last page.

HERE'S THE BUILT-IN QUALITY YOU GET IN THIS "Buffalo" FAN

In October of 1953, when we introduced the "Buffalo" Type BL Limit-Load Ventilating Fan, we knew it offered the finest features for quiet, stable, efficient performance in industrial service. Since that time, it has more than measured up to highest expectations.

A study of the "Q" Factor* features illustrated here will show you *why* this fan will give you your money's worth, and more, in *performance.* Further details in Bulletin F-102, your copy upon request.

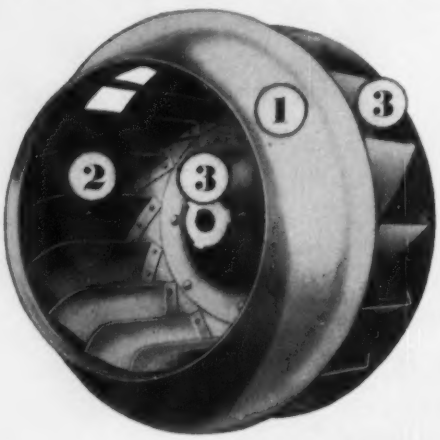


ENTIRE FAN

1. Housing proportioned and streamlined for peak efficiency.
2. Self-aligning bearings; choice of sleeve or anti-friction type.
3. Large, smooth inlet collar for easy duct connection.

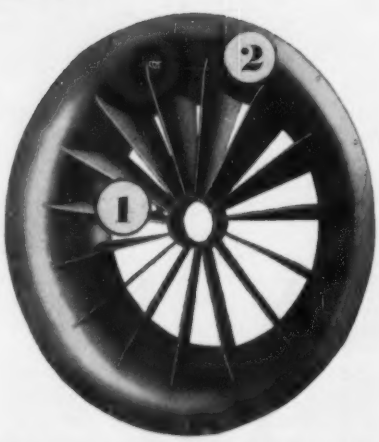
ROTOR

1. Shroud die-formed to full curvature, matching inlet bell, for proper air flow in wheel.
2. Backward *curved blades* for stable air flow. Die-stamped, welded and riveted for maximum strength.
3. Heavy gauge back plate — extra-heavy hub.



INLET

1. Exclusive "Buffalo" inlet guide vanes reduce turbulence and assure full rated delivery, even when inlet conditions are unfavorable.
2. Smooth, die-formed inlet bell matches wheel shroud, further reduces inlet losses.



**The "Q" Factor — the Built-in Quality which provides trouble-free satisfaction and long life.*

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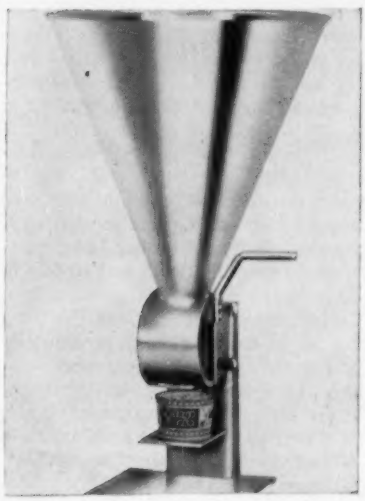
VENTILATING AIR CLEANING AIR TEMPERING INDUCED DRAFT EXHAUSTING FORCED DRAFT COOLING HEATING PRESSURE BLOWING

Designated as Stair Cart, it has a special ratchet mechanism for rolling upstairs as operator pulls the cable drive. And two-wheel safety brakes which permit constant control, prevent accidents when descending with heavy loads. Interchangeable shoes, steel ball bearings and steel tube construction are incorporated for load flexibility, efficiency, and durability.

Truck is equipped with large pneumatic tires to eliminate marking of steps. Six different models handle various different sizes of loads, including a special barrel cart and a complete welding cart.—*Valley Craft Products, Inc., 750 Jefferson Ave., Lake City, Minnesota.*

Circle 128B on Reader Service Card



Hand-Operated Filler Has High Capacity

Thirty cartons a minute may be accurately filled with this hand-operated cottage cheese filler, called Model 277.

Unit has a double-action piston that fills a container with every 180-deg. turn of the handle. As it fills one container, piston fills the cylinder for the next one. Piston consists of two heads joined by an adjusting screw that may be set to discharge from 4 to 16 oz. through a 3 in. dia. opening. This is said to permit passage of large-curd cheese with minimum breakdown.

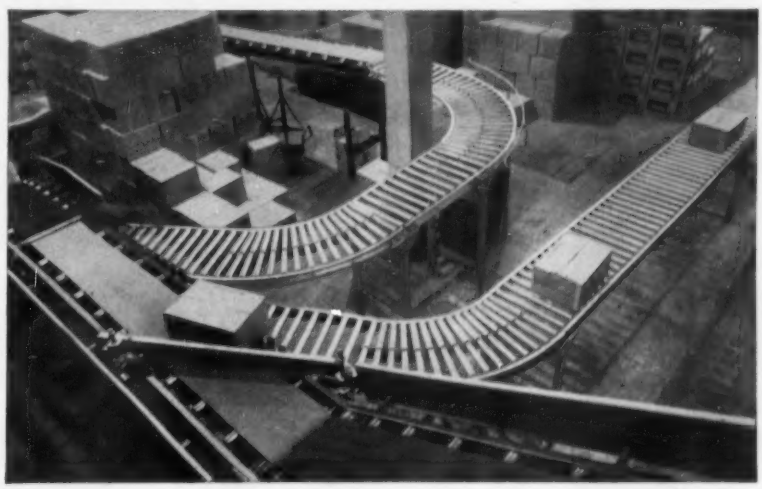
Other adjustments are provided for different cup heights and diameters. Hopper capacity is 12½ gal., and cup size ranges from 4 to 16 oz. Unit is 37 in. high and 12x12 in. at the base. —*Anderson Bros. Mfg. Co., Rockford, Ill.*

Circle 131A on Reader Service Card

"doodles" or complete plans?

Whichever you have

Standard's complete conveyor service can save you money!



Many a complex conveying problem has been solved by Standard engineers with only a customer's "doodle" drawing to follow. And often when complete plans are submitted, Standard engineers make recommendations that improve the conveyor application . . . save time and money as well.

If you prefer to do your own conveyor planning, we suggest you send for Bulletin 63-D. Here in 28 fast-reading pages you get all the specifications, drawing and application data on a wide range of Standard Conveyors. This includes gravity and power conveyors and accessory equipment: Handidrive pre-built conveyor units and the complete, self-contained portable conveyor units listed below.

Call your Standard Conveyor representative listed in your classified phone book — or send for copy of Standard General Catalog — address Dept. FE-8

STANDARD CONVEYOR COMPANY
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Nearly 50 years of conveyor experience

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PNEUMATIC TUBE SYSTEMS

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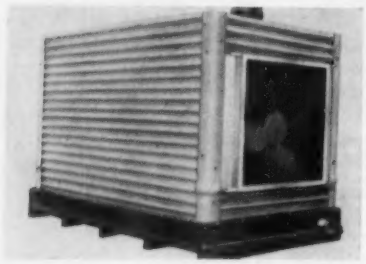
Equipment & Supplies



Wood-Type Cooling Tower Has Forced-Draft Design

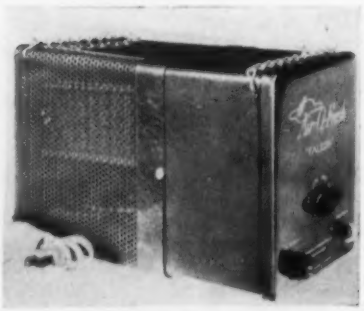
Shown above is one of a new line of wood mechanical-draft cooling towers to serve air conditioning or refrigeration equipment in capacities from 5 to 60 tons.

Called Wood Aquatowers, they are forced draft, cross-flow units with vertical air discharge. This permits location close to building walls on all but the air-intake side. Mechanical equipment is placed out of the air discharge stream.

Other features: Gravity water flow from easily inspected and cleaned open distribution basin, durable redwood filling, quiet operating fan with stainless shaft and bronze bearings.

Packages units up to and including 15 tons have all-wood construction. Larger models, 20 through 50 tons, are of all-redwood with horizontally corrugated asbestos cement board casing. Designed for corrosive service, tower structure is impervious to air or water, and all metal parts are fully protected.—*The Marley Co., 222 W. Gregory Boulevard, Kansas City, Mo.*

Circle 132A on Reader Circle Card



Ozonator Curbs Spoilage In Food-Storage Areas

Offered for control of mold, mildew, bacteria, and odor in food-storage rooms is a portable ozonator that plugs into any conventional 105-125v. a.c. outlet.

Heavy-duty unit (Air-O_3-Fresh Falcon) has four generating grids for diffusing controlled concentrations of

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NEW
SUPER
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contains

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PLASTIC
EMULSION

WHEN you apply new SUPER WESTWAX it's just like laying down a protective sheet of tough, transparent plastic on your floors. With NEW SUPER WESTWAX you get
— brilliant gloss
— extra durability
— freedom from discoloration
— easier maintenance

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West's crystal clear Plastic Emulsion, MIRITE®
and
prime #1 yellow Carnauba Wax.

IT combines all the features of the finest floor protection in a single wax:
— dries to a hard, mirror gloss
— resists scuffing from traffic
— resists water
— requires no polishing

And SUPER WESTWAX is slip resistant — meets Underwriters' Laboratories requirements for floor treatment materials.

OLDEST AND LARGEST
COMPANY OF ITS KIND
IN THE WORLD

LET a West floor expert demonstrate SUPER WESTWAX on your own floor — show you how easy it is to use. No obligation, of course. Just send the coupon.

WEST DISINFECTING Company

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In Canada: 5621-23 Casgrain Ave., Montreal

☐ I'd like a free copy of your folder on SUPER WESTWAX.
☐ I'd like to have a WEST representative telephone me for an appointment.

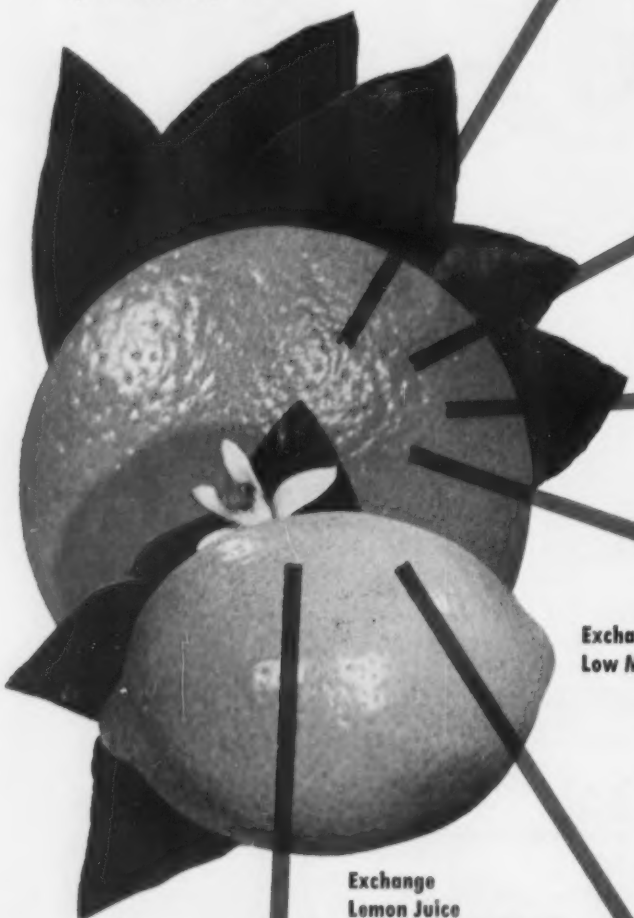
Name_____

Position_____

(Tear out this coupon and mail it with your letterhead)

Look to Sunkist
for progressive research in food processing

Yes, in every field of food processing, the Sunkist Growers laboratories are making ever-widening contributions to the increased quality of food products. Here are some typical Exchange Brand product developments.



Exchange Oil of Orange

Always consistent, always outstanding in flavor, strength and aroma. An essence you can rely on. Made from fruit grown in the famous Sunkist groves of California.

Exchange Oil of Lemon

The 4-to-1 favorite over all other lemon oils combined! The reason is the superior flavor that comes only from California-grown lemons processed by exacting Sunkist standards.

Exchange Preserver's Pectin

Here is *even* jell strength that gives you consistent, complete reliability in setting control.

Exchange Low Methoxyl Pectin

A natural fruit pectin that jells without sugar. Completely tasteless, permitting the use of the most delicate flavors. Pies made with Exchange Low Methoxyl Pectin won't "run" or "weep" when cut—and you have never tasted such natural juicy fruit flavor. Famous too for aspics, jellied fruit or vegetable salads, dietetic preserves or non-sugar jells.

Exchange Lemon Juice

Nothing can match lemon juice for bringing out the natural flavor of *any* food product. It's a superior acidulant in the preparation of mayonnaise, fruit cocktail, figs, fruit nectar, prunes and other heavy-syrup products. Highly effective as an anti-oxidant in processing frozen foods. Citric acid molecules have also been established as effective in the retarding of mold growth. Available in concentrated or single strength form.

Sunkist Growers

Exchange

PRODUCE DEPARTMENT • ONTARIO, CALIFORNIA
400 West Madison Street, Chicago 6, Illinois
99 Hudson Street, New York 13, N. Y.
310 Cadiz Street, Dallas 2, Texas

ozone, a powerful oxidizing agent. Output is regulated by a 4-way switch on the front panel.

According to maker, the gas retards ripening of fruits and vegetables, and prevents slime formation on meats. Furthermore, it is non-toxic because of the low current density used.—*Melco Sales, Inc., 305 5th Ave. S., Minneapolis 15.*

Circle 132B on Reader Circle Card

Easy-to-Use Macroscope Speeds Quality Control

Providing an erect, unreversed image in a wide field, this macroscope is said to simplify inspection on the production line and quality control in the laboratory. Magnifications of 10X, 20X, or 40X are available, and operation of the instrument requires no special training.

Unit consists of an optical tube, erecting prism, and inclined eyepiece holder. A folding tripod stand or a microscope-type stand are offered for work on flat surfaces. Working distance between optical tube and object is long enough for easy movement of irregularly shaped pieces. And measurements can be made with scales available as accessories.—*Bausch & Lomb Optical Co., 635 St. Paul St., Rochester, N. Y.*

Circle 135A on Reader Service Card

OTHER DEPARTMENTS
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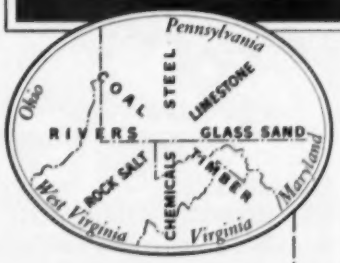
Nature has played some pranks in its distribution of fresh water. She has acted Lady Bountiful in many parts of the area served by the West Penn Electric System—in the five states of Maryland, Pennsylvania, West Virginia, Ohio and Virginia. Ample water for processing and cooling is available there the year around in numerous rivers and streams and in proven underground sources.

Choice plant sites with good water resources are steadily dwindling while industry's over-all need is rapidly growing. Reporting on the Nation's water resources for the Federal Government, a prominent hydrologist concludes that "by 1975 water supply may be the most important factor affecting plant location."

If you need water to make your product, look into this question of future water supply. For quick facts on plants and plant sites with abundant water, phone our Area Development Department, WHitehall 4-3740—or send in the coupon below.

Monongahela Power Company · The Potomac Edison Company · West Penn Power Company

West Penn Electric System



West Penn Electric System, Room 924
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Without obligation, please send me a hand-picked assortment of current Industrial Data Sheets on available industrial buildings and sites in your service area.

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Chemiseal sanitary gaskets and packing

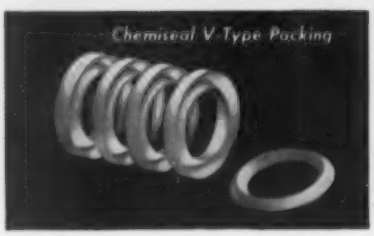
● Throughout the Food Industry, TEFLON's inertness to all food acids, alkalies and solvents—its zero water absorption and extreme anti-hesiveness—make it the ideal gasket and packing material for corrosion, contamination and sanitation problems.

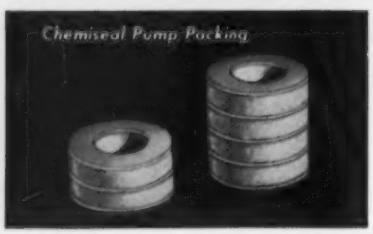
CHEMISEAL TEFLON-JACKETED GASKETS are available in any size, with a variety of filler materials suitable for glass, glass-lined, porcelain-lined and metal piping and equipment. These fillers are protected on both faces and the inside diameter by the inert TEFLON Jacket. Catalog No. TG-953.

CHEMISEAL SNAP-ON GASKETS are molded to match contour of conical-end glass pipe. They assure perfect automatic centering of joints and free flow of materials. Made for all standard pipe sizes from ¼ in. to 6 in. Catalog No. TG-953.

Chemiseal Teflon-jacketed Gaskets

Chemiseal Snap-on Gaskets


Chemiseal V-Type Packing


Chemiseal Pump Packing

CHEMISEAL V-TYPE PACKING is the ideal valve packing that seals with low gland pressures and operating torque. Extremely resilient, tough and anti-hesive—it will not seize the valve stem or shaft even when handling the most difficult solutions. Supplied in sets with square end adapters. Catalog No. TP-1053.

CHEMISEAL PUMP PACKING is extremely effective for rotating and reciprocating shafts. Provides a low friction 2-way seal that not only prevents axial seepage, but also seals against shaft and stuffing box as well. Supplied in sets to meet specific requirements. Catalog No. TP-1053.

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Stable Additives Provide Natural Yellow Color

Uniformity and stability are advantages cited for two new coloring agents, offered for imparting a natural yellow color to margarine, shortening, butter, bakery products, and edible oils. Both products are compatible with Vitamin A under the industrial processing conditions.

The first item is a vegetable color—an oil-soluble micro-crystalline annatto suspended in food-grade, deodorized cottonseed oil. This is added in the usual manner to margarine oil in the holding tank or churn prior to emulsification. Addition of 22.5g of the 20% suspension to 1 ton of margarine provides average color.

This concentration dissolves in the oil in 1 min. at room temperature. Should lighter (under 7.0 red) or darker (over 10.0 red) products be required, the above ratio can easily be varied.

Stability tests indicate no loss of color or Vitamin A in colored margarine heated for six hours at 140 F., or stored for 20 weeks at room temperature. And no loss of color is reported after eight weeks at 100 F. with air headspace. It is recommended that the vegetable color be stored under refrigeration.

Second product is beta carotene, whose provitamin A content is converted into Vitamin A in the body. It is the natural coloring matter of carrots, sweet potatoes, and leafy vegetables. The material is said to be easily handled, and can be blended with additional Vitamin A for full nutritional value.

Both the vegetable color and beta carotene are available in bulk or in custom blends with Vitamin A.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn 6, N. Y.*

Circle 136A on Reader Service Card

New Surfacing Materials Protect Concrete Floors

Use of two concrete finishes on new or old floors reportedly eliminates "dusting" and adds attractive, permanent color.

First material (Kwik-color Seal) is applied after floor has been cleaned and etched. Formulated from an emulsified resin, it is said to make cleaning easier and improve floor appearance. Odorless, non-inflammable, and easily applied finish dries in

MSG

99+% Pure Mono Sodium Glutamate Crystals

At first glance the connection between Great Western and MSG may not be apparent—

BUT, DID YOU KNOW

that—The Great Western Sugar Company is the largest producer of beet sugar in America?

that—sugar beets are a primary source of mono sodium glutamate (MSG)?

that—Great Western has now completed a new, modern plant for large-scale production of MSG?

that—MSG produced entirely under the supervision of a company with an unsurpassed reputation over the years in the food industry, would inevitably be a product of superior quality?

that—the addition of a small quantity of MSG to your basic formulas will heighten the natural fresh flavor present in good foods?

Discover **"The Secret of Good Taste"**—*Try Great Western's*

MSG

A Product of
AMERICAN AGRICULTURE

We invite inquiries from current and prospective users of MSG

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THE GREAT WESTERN SUGAR COMPANY
Denver, Colorado

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You can choose from Angelica's huge stock of styles and fabrics. Or if you have a unique problem requiring special uniform features, Angelica can solve that, too!

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Equipment & Supplies

20 min., and develops water resistance in about 14 to 20 days after the application.

To protect this seal against water during the "curing" interval, the second product (Kwik-Color Wax) is applied. This is a waterproof wax containing colored emulsified plastic resin. It gives a high gloss finish over the seal and further protects the floor. Also fast drying, it is said that busy floors are back in service within 2 hr. after etching, sealing and waxing.

Both products are available in tile red and light gray colors. Seal covers approximately 800 sq. ft. per gal., and wax about 1,000 sq. ft. per gal.—*Multi-Clean Products, 2277 Ford Parkway, St. Paul, Minn.*

Circle 136B on Reader Service Card

Briefs . . .

Electric Counter is made tamperproof by tumbler-lock reset requiring key to change figures. Unit operates at speeds up to 1,000 per min. on 110v., 60 cycle a.c.—*Durant Mfg. Co., 1907 N. Buffum St., Milwaukee 1.* (139A)

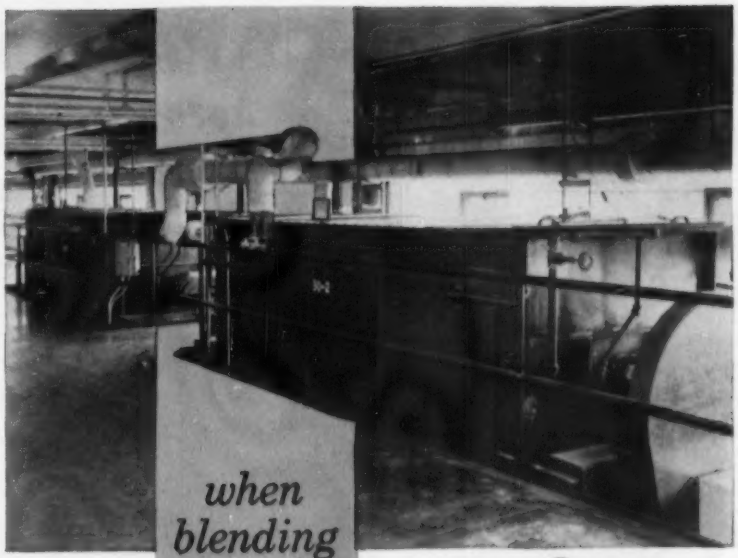
Cane Juice Clarifier offers 30% reduction in process time. Four-compartment unit has improved feed, greater tray spacing, and additional mud-thickener.—*Dorr-Oliver Inc., Stamford, Conn.* (139B)

Line-Purifier is designed to eliminate boiler shutdown caused by priming. Installed as a header, device intercepts water and entrainment leaving boiler.—*V. D. Anderson Co., 1935 W. 96th St., Cleveland 2.* (139C)

Kojic Acid (an active pyrone) is offered as a base for manufacture of metal chelates used as antioxidants and water softening agents.—*Chas. Pfizer & Co., 630 Flushing Ave., Brooklyn N. Y.* (139D)

Positioner Relay Kit for air-operated control valves maintains stable sensitivity and response, amplifies control signals, and provides sequence operation of two or more valves.—*Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10.* (139E)

Heat-Resistant Cog V-Belt, developed for baking, coffee roasting, and candy applications, operates effectively up to 180 F. Made of synthetic rubber (without covering material), unit dissipates heat rapidly and is impervious to oil and grease.—*Dayton Rubber Co., Dayton, Ohio.* (139F)



when blending

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DAY JUMBO MIXERS . . . meet every requirement for maintaining a thorough blend of chocolate products under sanitary conditions at The Nestlé Company, Inc., Fulton, N. Y. For instance: seals may be furnished of sanitary construction requiring no packing, and of such simple design as to permit thorough cleaning in a matter of minutes between batches—(no more black specks working into product from stuffing boxes).

Outboard bearings on all models allow plenty of room for normal cleaning and maintenance. Special agitators available for blending high shortening content products. Heating or cooling jackets, dust covers and many other optional features available. For complete information write for Bulletin 800.

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Quality equipment for baking, paint and varnish, printing ink, chemical, rubber, pharmaceutical, cosmetics, paper and pulp, explosives, food, ceramics, candy, soap, sugar and milk products.

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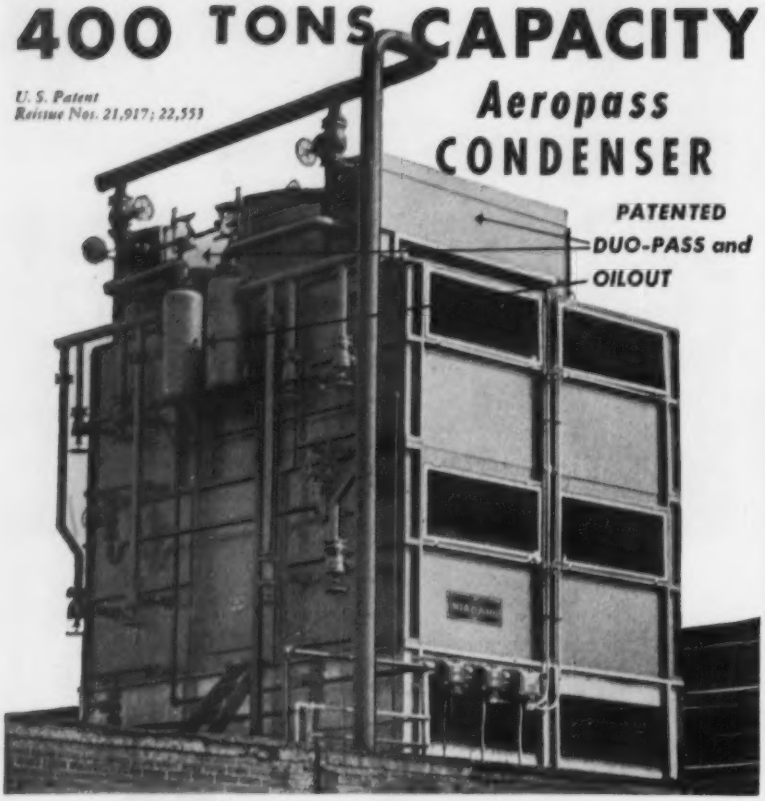

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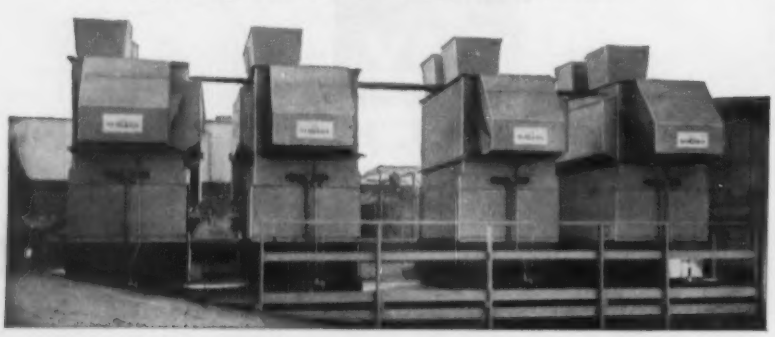

Equipment & Supplies

Packaged Preheater automatically heats dairy products to 200-260 F. range in seconds, protects flavor.—*Chicago Stainless Equipment Corp., 5001 Elston Ave., Chicago 30.* (140A)

New Masking Agent controls protein decomposition odors arising from operations such as waste disposal or fat rendering.—*Fritzsche Brothers, Inc., 76 Ninth Ave., New York City 11,* (140B)

Relish Dryer, mounted in angle-iron frame, has capacity up to 7,500 lb. per hr. Driven by ½ hp. variable-speed motor, unit consists of feed hopper, tapered screw and cover, and perforated bottom screen.—*Chisholm-Ryder Co., Niagara Falls, N. Y.* (140C)

Drum Faucet, made of polyethylene for corosion resistance, light weight, and durability, fits standard ¾-in. drum openings.—*Multi-Meter Corp., P. O. Box 154, West Toledo Station, Toledo 12, Ohio.* (140D)

Rubber-Base Interior Paint that resists moisture and chemical fumes has good color retention.—*Tremco Mfg. Co., 8701 Kinsman Rd., Cleveland 4.* (140E)

Low-Lift Truck (platform type) has load-scale attachment to prevent overloading of floors and elevators.—*Lewis-Shepard Co., Watertown, Mass.* (140F)

Multi-Component Mixtures of gases or volatile liquids are analyzed in portable apparatus based on gas chromatography principle. — *Perkin-Elmer Corp., Norwalk, Conn.* (140G)

Conveyor speeds materials handling by combining live rollers on straight-away with gravity rollers on merging sections.—*Sage Equipment Co., 30 Essex St., Buffalo 13, N. Y.* (140H)

Stainless Filter Press has plates with readily removable screens for easy cleaning. Stationary or portable models are available in 18-in. and 12-in. sizes, equipped with motor, pump, and piping.—*Valley Foundry & Machine Works, 2510 S. East Ave., Fresno, Calif.* (140I)

Steam Cleaner with heat-exchanger and pump delivers up to 300 gal. per hr. of pH-controlled cleaning solution. Other models (gas or oil-fired) have ratings up to 3,000 gal. per hr.—*Kelite Products, Inc., 1250 N. Main St., Los Angeles 12, Calif.* (140J)

ANOTHER WAY it pays to package with film made of BAKELITE Polyethylene

"CELLOTHENE" made by **Cheslam Corp.**, Yonkers, N. Y.

"laminating with polyethylene opened up a big market"

"In fact," says K. C. Bradford, president of Custom-Pak, Cincinnati, Ohio, "laminating cellophane with a polyethylene liner is the only really practical way we found to package our 'single-portion' foods and other liquid and semi-liquid products."

Here is why. "We needed a package that must hold its pouch-like shape . . . hold liquids tightly sealed under rough handling and shipping . . . resist chemical action of all food products . . . stand high-frequency sealing . . . temperatures as high as 120 deg. F. as well as low temperatures for food freezing."

The polyethylene film provides the strength, flexibility against cracking, seal tightness, and extra chemical resistance needed. "Costwise we have found this combination best," adds Mr. Bradford.

Whatever you package, investigate film made of BAKELITE Brand Polyethylene. Your packaging supplier can give you all the profitable facts.

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MERCK INGREDIENTS IMPROVE FOOD PRODUCTS

Pint-sized gourmets really go for margarine that is fortified with MERCK VITAMIN A. Even control chemists are impressed with the light color, consistent stability, and absence of off-odors of this superior product.

Discriminating shoppers reach for frozen peaches protected by MERCK ASCORBIC ACID. This anti-oxidant prevents browning and keeps flavor fresh —boosts consumer acceptance by licking the problems that face many frozen food processors.

This butcher moves his sausage products faster because they look more appetizing. Their better, longer lasting cure-color is due to CEBICURE* or CEBITATE,* Merck's ascorbic acid and sodium ascorbate designed for the meat industry.

Sales-wise and cost-conscious bottlers know that MERCK *Anhydrous* CITRIC ACID sparks up flavor and keeps costs down. They also know that fortification with MERCK ASCORBIC ACID promotes sales, and in many cases, protects flavor too.

Research and Production for the Nation's Health

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY

*Trade-mark.

Stick-Candy Making

—Continued from page 63

beneath the gage, without opening the circuit. Then the light goes out, warning the spinner to increase the size of his rope.

From the gage-roll, the candy is guided against the steel rod, as it is carried onto the first belt. The combination of the belt moving in one direction and the counter-rotation of the rod provides one complete twist of the candy rope for a 4¼-in. stick.

In order to cool the candy and make it brittle enough to break off in the proper lengths, the assembly of rod and belts carries the product through a refrigerated 1-ft.-square tunnel (see photos). Air refrigerated by an 8-ton compressor is blown into this tunnel at 2,300 cfm. to maintain an inside temperature of 51 deg. F.

As the rope exits from the fifth belt, the sticks break off in the proper lengths and slide down a chute into a waiting tray. Here they are manually handled for the first time since the candy left the spinner. A woman operator spreads the sticks evenly in long trays, which then are placed on a cart for delivery to wrapping.

The candy twisting machine processes the 85-lb. batch—spun into 4,250 standard sticks 4¼-in. long—in 9 to 12 min.

This same production required 45 min. when the twisting was done by hand. Thus, two girls who formerly handled the twisting are replaced by the one girl who removes the candy from the belts and places it on trays.

Re the Wrappers

Wrapping machines are installed in a room where the temperature is maintained at 65 to 68 deg. F. with humidity at 45%. One machine is used exclusively for the 8½-in. length, while two others wrap sticks 4¼ and 5¾-in. long.

In operation, a roll of cellophane of the desired width is placed on 2-in.-dia. steel rolls, then fed into the cutter, under tension created by other rolls, whose rpm. determines the length of the cellophane (2½-in. for a stick of ¾-in. dia.). The faster the rolls turn, the longer is the sheet of cellophane between cuts.

Candy sticks are fed manually into the machine at one end, with one operator supplying two feed chutes. As the cutter slices the cellophane, a steel bar with multiple vertical fingers is raised, allowing one stick to drop onto the cellophane, which is now held in position on a rubber roller by a weighted steel roll.

The rolls turn and the candy is encased in cellophane. Then steel grippers pinch the cellophane at each end of the candy stick, and they hold it tightly while the wrapped stick is turned between them, supplying the twist to seal the wrap at each end.

At normal speeds, the machines wrap 135 sticks a minute and deposit them upon a belt leading to the packaging operator.

This conveyor belt serves an additional purpose to that of moving the wrapped candy from machine to packing station. The speed of this short, endless belt is synchronized with that of the wrapping machine in such a manner that it "counts the sticks" (usually 80 to a carton). In detail, a bar, across the belt indicates to the packer when the belt has made a complete revolution. Further, the speeds of the wrapping machine and the belt are synchronized so that 80, 120, or any desired number of sticks will be conveyed to the packer in a single revolution of the belt. The packer merely fills cartons with the candy moving to her on the belt during each revolution of the bar.

In the old manual operation, one girl could wrap only 18 sticks a minute. And the counting and packaging was left to a second girl. As for product attractiveness, the machine's uniformly wrapped stick has more eye appeal than a hand-wrapped stick.

Brown & Haley, established in 1913, is known internationally for its Almond Roca. Further, its Mountain Bar is one of the three top sellers in the West Coast market. Wallace D. Arbuckle is superintendent over 275 employes producing up to 15 tons of candy daily.

End (Resume reading on page 64)

Another Research Boost

—Continued from page 95

▶ "Tailormade" starches—refined grits as well as thin- and thick-boiling types—are pilot-tested to aid food-industry users. Investigated are improved uses of these starches in beer, baking powder, confections, bakery products, salad dressing, dessert powders and puddings, soups, corn, mince meat, chop suey, sauces, meat products, etc. Similar work is carried out on corn syrup products.

The first floor also has a large storage area for production samples and equipment, and an office which furnishes samples of products to customers.

Second Floor Labs

Research and general control laboratories are located on the second floor. Tested in the latter are prod-

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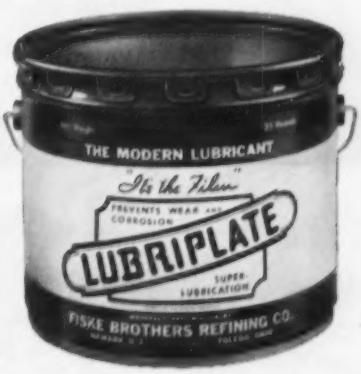

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BEST FOODS CO.
Chicago
Bayonne, N.J.

BIRTCHERD DAIRY, INC.
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BORDEN COMPANY
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Macon, Ga.

PERCY A. BROWN & CO.
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Houston
Phoenix, Arizona

COLONIAL BAKING CO.
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Cedar Rapids, Iowa
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Hutchinson, Kan.
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MRS. SMITH'S PIE COMPANY
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NATIONAL BISCUIT CO.
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RAINBO BAKING CO.
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RICHMOND DAIRY CO.
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SAN JOAQUIN BAKERIES, INC.
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ucts during all stages of refining. Qualitative, quantitative, and bacteriological laboratories are devoted primarily to work on special production and customer-application problems.

Occupying offices on this floor are J. M. Seitz, director of research and laboratories; J. E. Boyle, technical sales director; and J. Harness, chief chemist. Assisting are four technicians on research, 12 on control.

Conveniently located at one end of the general control lab is a library containing technical and reference books, periodicals, technical journals, and trade papers. Completing this floor is a large chemical and equipment storage room.

A full-span ceiling and easy-to-remove wall partitions provide flexibility for future redesigning of the laboratory. Utilities (pipes for steam, water, and vacuum, as well as electrical wiring) for the top floor can be easily spotted and hooked up by simply cutting holes into this floor.

Equipped For Many Tests

Laboratory facilities comprise:

1. Corn Industries viscosimeter for testing viscosity of cooked starches, also a Brookfield viscosimeter.
2. Miniature mixing facilities to evaluate effect of pH, temperature, and chemicals in production of starches with different characteristics.
3. Moisture tester to quick-check moisture content of starch. Test takes about 15 min. instead of the 4 hr. of the oven method. Testing is also speeded by use of Karl Fischer reagent for titration.
4. Six electric heaters with refluxes and oil baths to determine moisture of starches. Method takes about 16 hr., but it serves as a reference for other moisture-testing techniques.
5. Scott viscosity tester for starch solutions. Flow of solution is measured in ml. per sec.
6. Three ovens for determining moisture.
7. Extraction apparatus to check amount of oil in gluten feed and cake meal.
8. Muffle furnaces for ash determination.
9. Air drying ovens.
10. Titration units for determining reducing power of corn syrup.
11. Other apparatus for checking color, pH, and acidity of syrup.
12. Battery of Kjeldahl nitrogen digesting and distilling units.
13. Complete equipment for precise qualitative and quantitative testing of products for trace minerals, oil rancidity, etc.
14. Bacteriological facilities.

End (Resume reading on page 96)

You can save as much as 85% of your present carton storage space by making up cartons as you need them from inexpensive, flat, die-cut blanks. A PA Carton Former is completely automatic, will set up and feed finished cartons into your production line at speeds up to 100 a minute. Users have found that direct savings in material and labor costs paid for this equipment within a year.

The high speed PA Carton Former sets up single end wall cartons from 3½" to 13" long and 1½" to 9⅞" wide, with ⅜" to 4½" high end walls. In double end wall cartons, the size range is 3½" to 13" long and 2" to 9⅞" wide, with ¾" to 4" high end walls. Other models handle larger sizes. Conversions from one size to another are quick and easy, can be made in as little as twenty minutes.

For more information on the PA Carton Formers contact your nearest Package office. A representative familiar with your type of operation will be glad to show you how a PA Carton Former can be used to the best advantage.

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NEW PACKAGES & PRODUCTS

New Cracker Package

"The smorgasbord cracker" in the Checkerboard Package is new slogan emphasized on Ralston Purina Co.'s new Ry-Krisp package. Designed to stimulate sales and make product identification easier, the package holds three individual packets of the crackers wrapped in waxed paper.

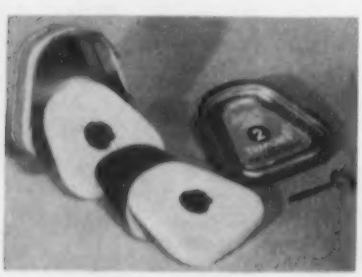
Illustrations on the label show the cracker with cheese and soup. The package design retains the familiar red and white checkerboard pattern.

New Liquid Shortening

Now being test-marketed in Columbus, Ohio, is Whirl, a liquid shortening made by Procter and Gamble Co. Packaged in pint and quart cans, the product is reported to be a genuine shortening and not a cooking or salad oil.

The shortening may be used for cooking, baking, or frying, and simplifies measuring problems.

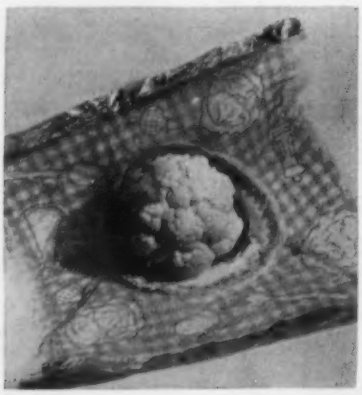
Whirl will be packaged in a special no-drip "metal bottle".



Foie Gras For Two

Portion control has come to foie gras with the use of a specially designed tin by Edward Artzner, French processor. Two slices of the goose liver with truffles are packed in a shallow key-opened can. The slices are separated with a tin plate.

The can enables restaurants to serve two portions without opening the larger standard cans.



New Cauliflower Wrap Slashes Freight Costs

Greatly increased sales, drastic cuts in freight costs, and longer shelf life for cauliflower is reported with use of a new cellophane wrap originated by Foil-Lok Co., San Francisco, and produced by Modern Packages, Inc., Los Angeles.

Wrap is an 18 x 18 in. sheet of Sylvania 300 DSB cellophane with 1 in. strips of aluminum foil laminated to two opposite edges of the cellophane during the sheeting process. The patented Foil-Lok permits an easy twist closure at the back of the head without the need of a heat seal or other closure.

Currently being used by Jim Watkins & Sons, Watsonville, Calif., grower and shipper, for its Trim Rite cauliflower, the wrap has resulted in a saving of 5-10% on packaged heads. Quality on arrival is reported as excellent, with good color retention of head. All of the packaged heads have been sold in the original wrapper.

The Trim Rite wrapper is flexographic printed, with a large circular window offering good product visibility.

Packaging Operation

Brought in from the field in carts, the cauliflower are emptied onto drapes by the trimming tables. Trimmers remove all but the last jacket leaves and place the head on a chain belt. Hydrocool unit simultaneously removes field heat and applies a decay inhibiting agent. The heads continue to wrapping stations where they are hand-wrapped in Foil-Lok sheets. Use of the new sheets enable wrappers to increase production by 50%.

After wrapping, heads are packed twelve to a crate fitted with a corrugated divider. The crates are stacked 12 to 14 high, making it possible to load twice the number of packaged heads as bulk heads in one car. Cars are precooled and bunker icing and fans maintain a temperature of about 38 deg. F.

Circle 146A on Reader Service Card

70 Times Sweeter

Marketed by Loeb Dietetic Food Co. is saccharin-free, low-calorie concentrated sweetener reported as 70 times sweeter than sugar. Processed in either liquid or powdered form, the sweetener is filled in 2½- and 6-oz. bottles with dispenser caps.

Called Steda-Sugar, the liquid is suitable for coffee, tea, or beverages, as well as for cooking and baking.

The product is stable, and does not bake out or lose its sweetening power. There is no aftertaste.

Ingredients are water, 0.1% benzoic acid, 0.05% methylparaben, and cyclamate calcium.

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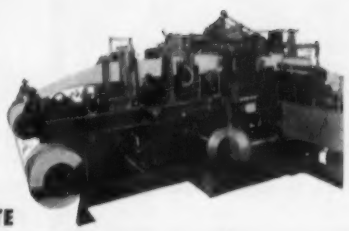
MANY PACKAGES OF BORDEN'S INSTANT STARLAC USE POUCHPAK*, A RIEGEL LAMINATE OF SPECIAL POUCH PAPER, POLYETHYLENE AND FOIL, HEAT-SEAL COATED. *TM



45 PER MINUTE ON PNEUMATIC SCALE MODEL 769 MACHINE

Protecting the sales-winning qualities of fine products is only one of the many functions of Riegel papers. Saving money is important, too. Riegel does it for you by creating the right combination of the most efficient packaging materials . . . and by "tailor-making" the paper to run and seal at high speeds on your machines. Tell us what you want paper to do for you. Riegel Paper Corporation, P.O. Box 170, Grand Central Sta., New York 17, N. Y.

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Salt from Sea Water

Called Trace Element Sea Salt, an unusual free-flowing table and cooking salt made by evaporating sea water, is being processed by Trace Elements Corp., Houston.

Soon to be placed on the consumer market, the salt is reported to contain all the presently known mineral elements in essentially the same proportion that they exist in sea water. The Trace Element Sea Salt contains 50.5% chlorine, 27.5% sodium, 3.4% magnesium, 0.86% calcium, 1.83% sulphur, 1.13% potassium, 100 ppm. iron, 33 ppm. fluorine, 20 ppm. copper, 0.013 ppm. molybdenum, 0.3 ppm. phosphorus, 1.5 ppm. iodine, 0.03-0.3 ppm. manganese, 0.15 ppm. zinc, 0.1-1.0 ppm. cobalt, and traces of many other minerals and elements.

The salt is made at Baffin Bay, selected for its high salinity.

The water, twice as salty as ordinary sea water, is collected, strained, and placed in a huge concrete tank. There the foreign matter and sand are settled out. Strained again, the water is placed in a reservoir and filtered. It is then passed through treatment tanks and a submerged combustion evaporator. About 50% solids at this step, the water then goes to a rotary gas dryer from which the crystals are fed to a packaging line.

Pop from a Pill

Called Lucky Pop, a pill that makes a carbonated, sugar-free beverage is being distributed by Real Gold Co., Redlands, Calif. Made in root beer, wild cherry, grape, cola, lemon-lime, and orange, the product is dropped into an 8-oz. glass of water to make a sparkling pop.

The package, moisture-proof and constructed of a laminated strip holding three pills, is held in a cardboard sleeve. The sleeve is printed with the brand name and the Commendation Seal of Parents Magazine.

Sweetener in the pill is sucaryl.

Rigid Plastic Containers

Clear, rigid plastic containers that protect products and add colorful eye appeal are used by C. M. Pitt & Sons Co., Baltimore, for assorted preserved fruits.

Available in 4-, 8-, 16-oz. sizes, the containers are made of a special B. F. Goodrich Chemical Co. Geon vinyl material, and were developed by the packer and the Hedwin Corp., Baltimore.

Advantages of the rigid plastic package are: It keeps the fruit soft and tender; color remains true; self-locking tops permit reclosure of box after a portion has been used; easier stacking for display and storage; the container is sturdy and results in freight cost savings.

Fruits now being packed in the plastic packages include cherries, pineapple, lemon peel, ginger, citron, and orange peel.

Circle 148A on Reader Service Card

Cake, Pastry Decorations

A line of cake and pastry decorations called Decors are now being processed by McCormick & Co., Baltimore. Made in six assorted shapes and flavors, the confections are packed in 2-oz. glass jars with screw caps. Three of the containers, used for very small items, have aluminum foil sifter tops.

Quadruple Bird Box

Four individual turkey boxes may be packed in a fibreboard shipping container designed by Container Corp. of America, Chicago. Called Multividual, the carton was designed for Chester B. Franz, Inc., of St. Louis.

The carton reduces cost of freezing and storing individual bird boxes. Excess listing of weights is also eliminated since each box is marked with individual weight and the carton with the total weight.

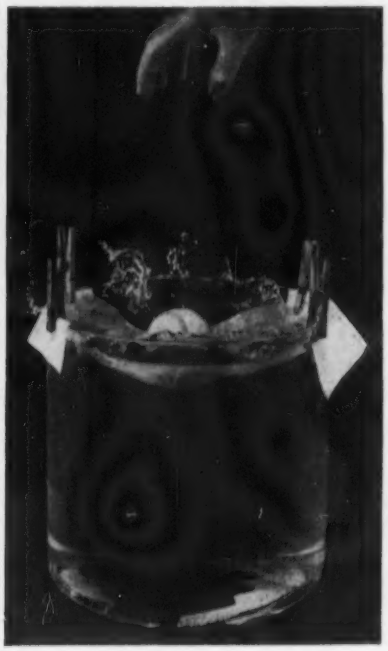
An individual opening device adds convenience. Each box may be opened easily without separating the box from the Multi-vidual carton. The four boxes fit into a sleeve that makes up three sides of the unit. They are held in the sleeve by flaps at both ends of the individual boxes. Once separated from the sleeve, the opening device becomes a carrying aid.

Circle 149A on Reader Service Card

For the Barbecue Pit

Bottles and foil packets are being utilized for the line of Arties seasonings processed by Nu-Way Foods Co., Atlanta. A wide range of products including barbecue sauce, meat tender-

Which paper is Patapar?



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No matter how you test Patapar Vegetable Parchment—in a water tank with a baseball, or for some specific application – it will come through with flying colors. *Patapar's wet-strength is sure and permanent.*

Resists grease, too

Patapar's high wet-strength, plus the fact that it resists penetration of grease, fats and oils may be the economical solution to some problem in your business.

As a packaging material, Patapar is the proven protective wrapper for products like butter, poultry, margarine, ham, sausage, cheese, confectionery, ice cream, putty, oiled machine parts.

In other fields, Patapar has won praise as a release liner for tacky substances, as a translucent master sheet for direct print copy machines, as a dialyzing membrane, as a release backing for polyester film, and in hospitals for wrapping articles to be sterilized in live steam.

MANY DIFFERENT TYPES – Patapar is produced in hundreds of different types for a wide variety of applications. It is available in sheets or rolls – plain or colorfully printed.

Tell us the application you have in mind, and we'll send information and samples of the type of Patapar we recommend.

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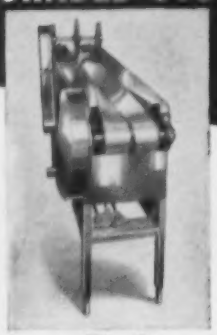

NEW *Robins*
UNIVERSAL HALVING MACHINE

For pickles . . . peppers . . . oranges . . . grapefruit . . . apples . . . cherries

You can cut grading time to almost nothing when you have a Robins Universal Halver. New trough-feed design automatically aligns stock of varying size. Simple change of one, easily accessible, finger type aligner permits change of production run within a few minutes.

Stainless steel contact parts and Neoprene belting assure perfect sanitation and easy cleaning. Can be fed by hand or by Robins Speedmatic Feeder.

WRITE FOR DATA SHEET...
gives operating data, specifications

Robins offers a complete line of "advanced feature" food processing equipment designed to speed production, raise quality and cut costs in canning, freezing and dry-packing plants. Food processors of all types are invited to write for Robins Catalog because many of these production-proved items are readily adaptable to processes other than canning.

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Whether you're planning a completely new layout or adding new equipment, Robins offers you experienced assistance. For aid on such production problems as labor, material flow, or space, talk to Robins. Wire, write or phone.

izer, potato anti-oxidants, and a charcoal flavoring, are directed at making life easier for the chef and barbecue expert.

A Gourmet Chest contains tall 4-oz. jars of the Spud-Nu (antioxidant), meat tenderizer, gourmet seasoning, smoke-flavored barbecue sauce, and Char-Broil. The last is a fine powder that may be sprinkled on meats for a charcoal-broiled flavor and appearance. Carton is pink, purple, and silver.

Foil envelopes hold ¾-oz. portions of the seasonings for consumer use. All feature the Artics brand name and an illustration of a chef measusing seasoning. Color of label aids in identifying the product.

Add Two Cake Mixes

Chocolate Malt and Peanut Delight cake mixes have been added to the General Mills Betty Crocker line. Both oldtime favorites, the mixes are manufactured in package food plants

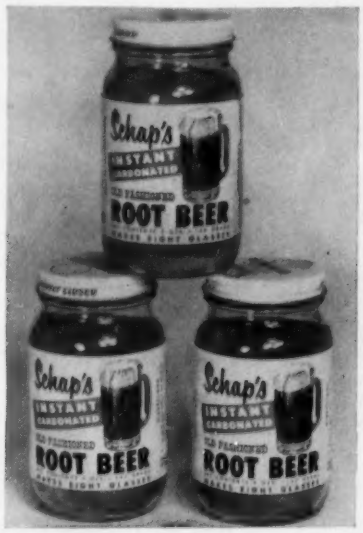
Candy Show Ideas for Packagers

FOUR CANDY PACKAGES were demonstrated by E. I. Du Pont De Nemours & Co. at the recent National Confectioners Show in Chicago. Suggestions for packagers were: 1) Christmas gift package printed in holiday colors. Candy is packed in cello overwrapped tray in a windowed sleeve. 2) Bag holds 30 individually wrapped peppermint sticks. 3) "Trick or treat" package has 40 individual packets of candy corn. Hallowe'en tag may be easily removed to convert package to standard item. 4) Picnic package has four fractional packs of marshmallows in cardboard collars. Each unit is wrapped in cello, the entire package then overwrapped with printed cello wrapper. Header label is carrying handle.

Circle 150A on Reader Service Card

located in Chicago, Toledo, and Lodi, Calif.

The peanut cake mix is the first to be made with real peanut butter. The chocolate malt mix is made with malted milk.



Instant Root Beer

Schap's Instant Carbonated "old fashioned" Root Beer offers four advantages to the consumer: (1) she can make a large glass of mildly carbonated root beer quickly and economically without waste; (2) product saves refrigerator or storage space; (3) no deposit-returnable bottles; and (4) one jar makes two quarts.

The powdered root beer is packaged in 5½ oz. clear glass jars with a four-color label on glossy coated stock. Bright yellow at the bottom of the label shades into white at the top with "instant carbonated" in white on a red banner. Jars are shipped 24 to a carton.

To mix, two teaspoonfuls of the powder are put in a glass over ice. Plain water or milk is added. The product is being introduced through newspapers, radio, car cards and point of sale.

New Salt Substitute

Developed and produced by General Mills from wheat gluten flour is Diet Savor, a salt substitute that is not bitter and will enhance the flavor of salt-free foods.

Made of mono ammonium gultamate, the product contains no metal and so is completely used up by the body's metabolic process, leaving no metallic residue. It contains no artificial aroma, color, or flavor. A maximum of 1% tricalcium phosphate is added to make the product flow freely.

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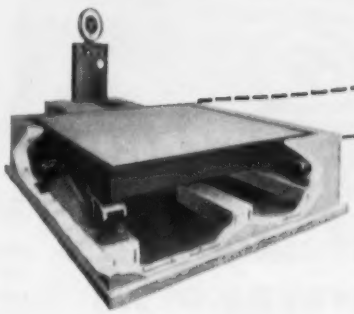
HI-WEIGH
TRUCK SCALES



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These Toledos help you check load distribution as well as total weight. Economical shallow pit installation. Choice of 20 ton capacity with 8′ x 10′ platform or 30 ton with 10′ x 10′ platform. Toledo dial offers quick, accurate weighing . . . outstanding dependability.

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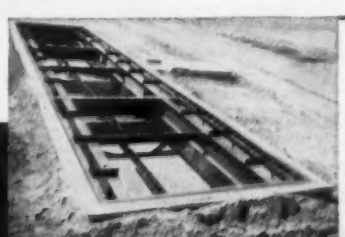

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New Way Cooker Control

—*Continued from page 75*

after the rate of heat input to the direct-fired unit is altered.

During this time lag, chips will be insufficiently cooked if the temperature is too low, and they will be scorched if it is too high.

And that is why the control system applied at Buckeye is ingenious, yet at the same time relatively simple. It varies the speed of the feed conveyor belt to put more or less raw potato slices into the hot oil. And it also speeds or slows the rake which moves the slices through the cooker.

Two effects, then, are brought into play. If the oil temperature rises, the faster feed of raw material, with its high water content, steps up the heat load and reduces the oil temperature. Secondly, the increased rake speed moves the chips from one end of the fryer to the other in less time to give the right cook. When the temperature drops, the reverse takes place.

All the while, heat input to the cooker is at a constant, maximum level for highest production capacity.

Automatic conveyor and rake speed changes are achieved through pneumatically operated variable-speed drives, one on each of the units. And the pneumatic system is actuated by two control elements in a dual control, two-pen recording thermometer made by Minneapolis-Honeywell Regulator Co., Philadelphia.

Conveyor speed is a function of the temperatures of the oil at both the inlet and outlet ends of the cooker. Rake speed is a function of the discharge-end temperature only. So two temperature-sensing elements are used, both of the long-length averaging type. One is placed across the inlet end near the bottom of the cooker. The other is at the opposite end near the top to detect the final oil temperature to which the chips are exposed.

A pneumatic averaging relay connected between the two control elements combines the action of the two temperature-sensing bulbs to control the feed conveyor. But the variable-speed drive of the rake is controlled by the instrument element actuated by the discharge-end sensing bulb, through a bypass around the averaging relay.

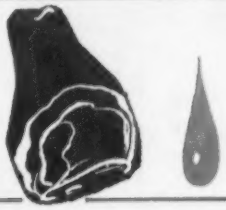
Both drive units have been rebuilt to adapt them to pneumatic control.

To eliminate another variable affecting chip production and quality, the level of fat in the fryer is held constant by a circulating system.

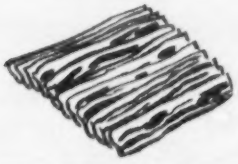
Quality also is improved by virtue of the fact that the fat remains in good condition. Temperature control avoids scorching, and the regulated

cure for tired packaging

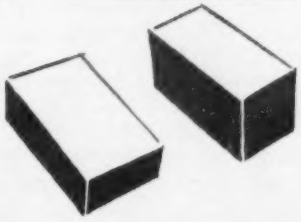
New life to your present design or a completely new wardrobe, **DANIELS** flexible packaging is the remedy that puts spark in product appearance and in sales. The **DANIELS** products listed below are the best in their respective fields. Our printing skills are . . . well, let's just say you can't buy better or more wisely.



PAQUATUF - a new greaseproof, moisture resistant packaging material for smoked meats, ham and bacon. Makes sturdy, crisp, clean packages.



BACON-PAK - finest greaseproof paper, created especially for smart sliced bacon packaging.



LARD PAK - more than just the right body and grease resistance for lard marketing.

MAR-PAK - the sensible greaseproof wrap for margarine. Custom made for the product - it performs beautifully in high speed automatic wrapping machines.

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Use the space now wasted on foam to increase your output by as much as 100%. For example:

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- **refinery still through-put increased from 1500 to 2500 barrels per day**
- **yield of textile vat dyes increased by 100%**

And you get increased production immediately without installing expensive new equipment. All you have to do in the case of most foamers is add a few parts per million of the water dilutable Antifoam AF Emulsion or, where solvents can be tolerated, a dispersion of Antifoam A. Both of these Dow Corning silicone defoamers are physiologically harmless. Both of them **increase production • reduce processing time • eliminate the waste and fire hazard of boil-overs.**

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feed avoids peak loads which would stir up burned chip particles on the bottom of the fryer.

All these factors together spell better, more uniform quality chips for Buckeye Foods. And they mean maximum production capacity for the two fryers equipped, increased efficiency, and better utilization of personnel.

The latter comes from the fact that the cookers can be operated by an unskilled attendant, while the plant manager spends his time in his executive capacity.

Since the cost of the control system, installed, is estimated to be in the range of $1,600 to $2,000, the investment will be returned to the company in a relatively short time.

End (Resume reading on page 76)

Food Radiation Roundup

—Continued from page 47

decreased on storage, and was minimized by irradiation in the frozen state. Some protection was given with antioxidants.

Little success was achieved with concentrated milk, dried milk, or butter. The butter bleached and became somewhat rancid. Addition of ascorbyl palmitate marketedly reduced peroxide formation.

Cheese. Undesirable physical and chemical changes were noted after irradiation of soft-surface ripened cheese at 800,000 rep. It had a non-appetizing malty odor and a slightly oxidized flavor. There was a structural breakdown and an almost complete bleaching. Processed cheddar and cottage cheese withstood 50,000 to 100,000 rep.

Eggs. A dose of 300,000 rep. could produce a Salmonella-free whole egg.[80] Off flavors were detectable in scrambled eggs at this level. However, post irradiation spray drying produced a product that was not significantly different from the control. Sponge cakes made from irradiated eggs were comparable in volume, texture, and organoleptic qualities to the control. McArdle noted an irradiation-induced flavor change in irradiated eggs, but this was not necessarily objectionable.[81]

Flour. Doses of 250,000 rep. kill adults and eggs of the grainary weevil, *Sitophilus granarius*, while 500,000 had the same effect on the flour beetle, *Tribolium*.[82] Wheat treated by these doses did germinate but didn't grow. Flour treated at these doses gave a satisfactory loaf of bread with a slight, but not objectionable, taste difference.

Fish. Haddock fillets kept 15 days after a 1,500,000 rep. dose showed insignificant increases in trimethylomine and volatile acids and changes in acceptability.[83] Haddock fillets irradiated at 700,000 rep. and held 6 weeks at 38 F. were acceptable.[84] Mackerel also showed no flavor change[85] at 1,500,000 rep.

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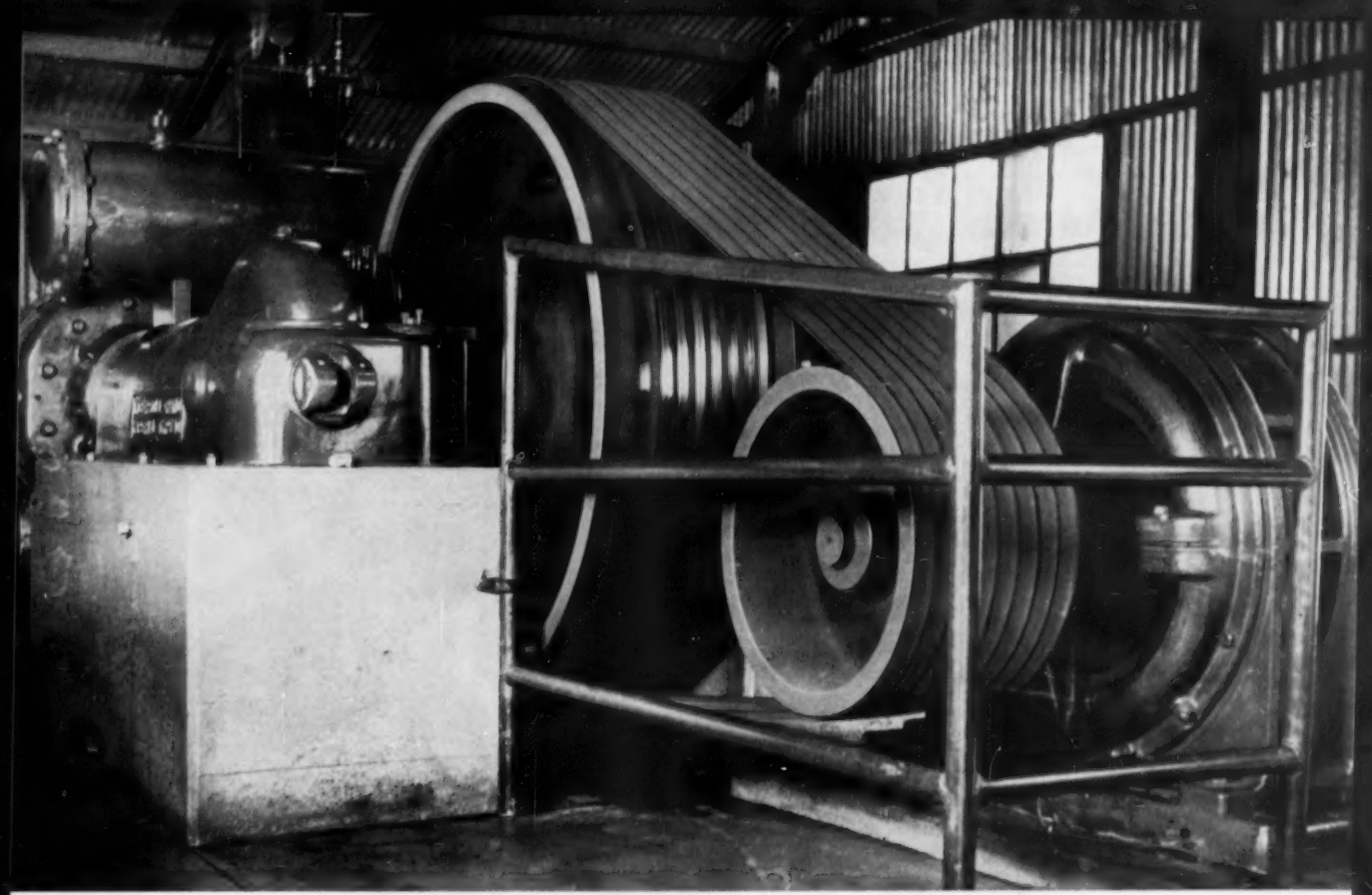
End (Resume reading on page 48)



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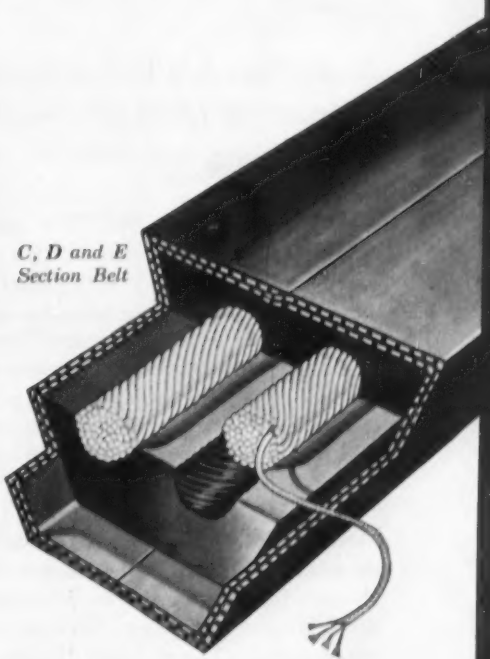

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ADVANCES IN TECHNOLOGY

Sweating Found Detrimental To Keeping Quality of Eggs

In an effort to determine effect of sweating on keeping quality of fresh laid eggs, half of those used in each experiment were artificially soiled, then 2 groups were prepared—½ clean, ½ dirty. Group 1 was held at 40 F. for 48 hr., Group 2 at 60 F., then both were exposed to 80 F. and 50% humidity for 6 hr.

Moisture condensation on Group 1 eggs was profuse, none appeared on Group 2. All were then placed in commercial storage and graded for quality by broken out appearance after 180 days.

Difference in keeping quality of clean and dirty eggs was small. However, sweating reduced their quality, and resulted in a marked increase in number of microorganisms on shell surfaces. — *Food Research*, 221-25, May-June 1955.

High Counts in Ice Milk

Inadequate sanitation at retail outlets, and holding mix too long at too high temperatures are main factors contributing to high bacterial counts in soft ice milk.

Fifty samples of soft ice milk, obtained from freezer operators in 19 Texas towns, were examined bacteriologically for total, coliform, proteolytic, and lipolytic counts. Fifteen samples gave counts exceeding 1,000,000 per ml., 25 over 100,000. Coliform counts were also high in many samples.

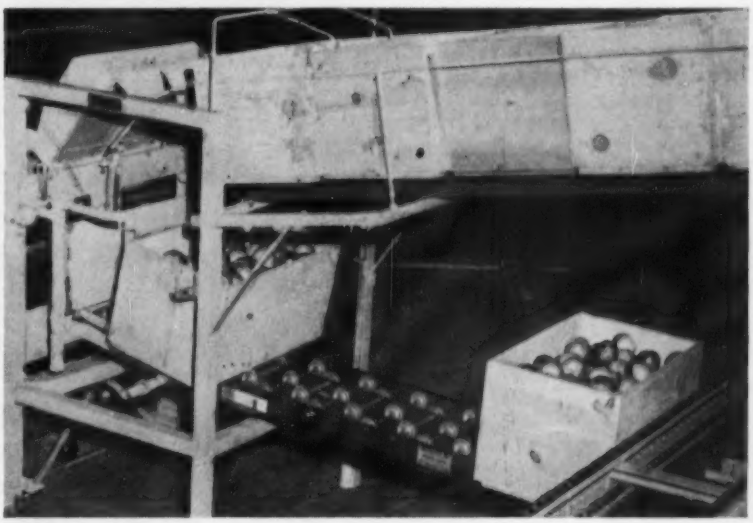
Counts on mix as received were satisfactory in most cases, but storage for periods up to 1 week at temperatures of 41-52 F. increased these considerably. Then, freezing in poorly cleaned equipment resulted in a high-count product. — *Food Technology*, 285-89, June 1955.

Osmosensitivity in Yeasts

Yeasts have long been known to vary in sensitivity to osmotic pressure of solutions in which they ferment sugars, and they eventually cease activity when pressure of the solution becomes high enough.

This osmosensitivity is also influenced by presence of flour. Therefore gas producing tests using sugar solutions are not necessarily satisfactory for prediction of yeast behavior.

Yeasts harvested at the height of their growth activity, that is, in the logarithmic phase of growth, are very osmosensitive and unstable, and may autolyze within a few days when stored at 20 F. Stability is given to such yeasts by allowing them to complete their fermentation cycles, exhausting the sugar in their substrates.—*Journal of the Institute of Brewing*, LXI 217-29, May-June 1955.



Packs Apples 3 to 4 Boxes Per Minute

An automatic filler that cuts cost of "loose filling" apples in wood or fiberboard containers from the usual 4-5c. per box for manual filling to less than 1c. has proved itself in tests by the Washington State Apple Commission.

The new machine (photo above) uniformly fills 3-4 boxes per min., with less bruising than most manual operations.

In it, the empty boxes move on gravity conveyor (top) to filling position (left). Here a chute (seen tilted, top left) conveys fruit from inlet with a minimum drop.

As the box fills, it swings downward and, when desired weight is received, energizes a solenoid that ejects the box onto roller conveyor (below). At the same time filling chute is tilted to stop flow momentarily while an empty box slides into the filling position—only 4 sec. are required to eject filled box and replace it with an empty one.

New device fills boxes uniformly within ±¼ lb. of desired weight. Only manual operation is renewing supply of empty boxes and removing filled ones from roller conveyor.

In addition to loose packing for immediate delivery, the following uses are seen for the unit: (1) Increasing efficiency of prepackaging operations by holding smaller apples loose for later bagging, and (2) placing small and lower grade fruit back in storage. *Marketing Activities*, (USDA Agr. Marketing Service, Wash. 25.) June 1955.

Humidified Cold Rooms

Surface desiccation of frozen products during storage can be reduced to negligible levels by use of jacketed rooms.

In a test room designed to measure temperature and humidity variations when using the jacket system, spatial variations in temperature were less than 2 deg. F., and humidities of 89-98% were maintained. High humidity levels are due to prevention of moisture escaping from the cold room.

Cost of operating a jacketed room may not exceed that of a directly cooled room, since increased efficiency of evaporators may more than offset the 10-15% greater power consumption required to circulation air. Insulation deterioration is greatly reduced in such systems owing to the elimination of moisture condensation on the walls.—*Canadian Journal of Technology*, 33, No. 4, 265-78, 1955.

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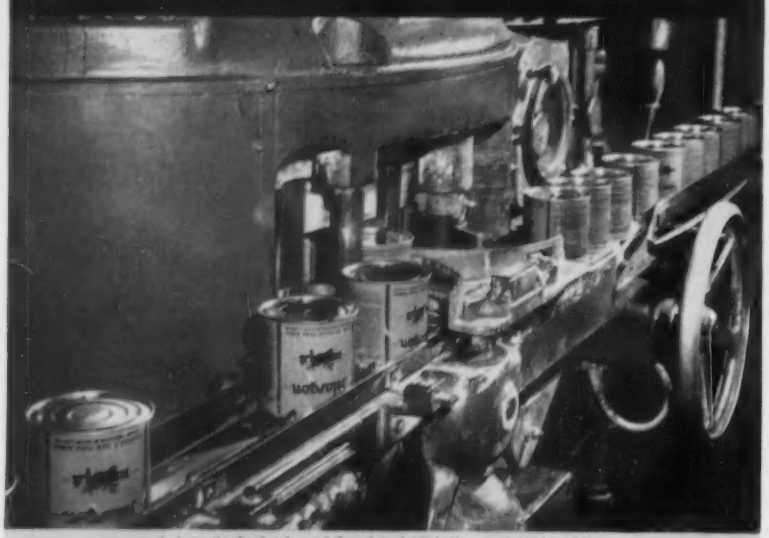


Automatic Packaging of Powdered Milk Formula at Nestlé Co.

Producing Their Own Gas Through a GAS ATMOSPHERES' GENERATOR

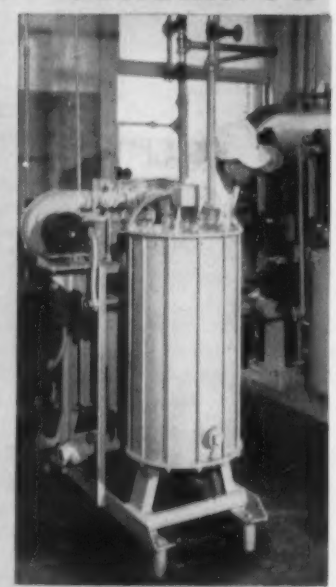
Costs Dropped From $9.60 to 15¢ per Day

Modern methods employed by the Marysville, Ohio, plant of The Nestlé Company, Inc., in packaging powdered milk formula for infant feeding call for the removal of all air, replacing it with an inert gas that prevents oxygen from coming into contact with the food. This is a practice that is rapidly gaining in popularity with the nation's leading food packers.

Nestlé's daily requirement of gas is about 1400 cubic feet. If purchased in cylinder form, this would cost approximately $9.60, plus the labor required for handling. By manufacturing their own gas, this amount costs a mere 15 cents. Figuring 320 working days in the year, the savings amounts to more than $3,000 annually—or enough to purchase generator equipment.

Nestlé has tried other generators, but prefers the Gas Atmospheres' because it gives them maximum production of highest purity gas at low operating costs.

Let Gas Atmospheres' engineers show you how you can produce your own gas at tremendous savings. Simply set down your requirements and they will estimate your equipment needs and give you a cost breakdown at no obligation.



Gas Atmospheres' Generator Used by Nestlé to Manufacture Inert Gas.

gas Atmospheres, inc

equipment for producing industrial gases

Detects Butter Adulteration By Tocopherol Procedure

To further aid detection of vegetable oils in butter, by the tocopherol procedure, in use for more than 2 yr. in Canada, an intensive study was made of the seasonal variations in tocopherol content of commercial butterfats.

Samples of butter were collected monthly from 29 selected manufacturers in 8 provinces over a 1-yr.—June '53-June '54—period, and analyzed for tocopherol content. Factories received milk from a large number of cows.

Samples taken during July-Oct., (summer months) gave mean tocopherol contents of 40, 42, 42, 42 ppm., respectively, with a range of 33-50. For Jan.-April (winter months) contents were 21, 19, 19, 21 ppm., respectively, with a range of 10-29.

During the "transition" months of June, Nov., Dec. '53, and May '54 mean contents were 34, 31, 27, 26, respectively. Based on these findings the Canadian Food & Drug Regulations were amended by insertion of a clause to the effect that "Milk Fat shall have a tocopherol content not greater than 50 mcg./g.

Results of the tocopherol procedure, on which 127 churnings of adulterated butter, having between 50 and 92 ppm. tocopherol, were seized, were compared with Reichert-Meissl and Polenske procedures. Data showed that it was not possible to detect these adulterations by the latter tests.—*Journal of Dairy Science*, 333-39, April, 1955.

Coconut Fat Dry "Milks" Have Good Storage Life

Substitution of coconut oil for butterfat in dried milk gives a product that retains its desirable flavor for an extended period at room temperature.

To determine whether it is possible, by use of refined fats, to prepare a dry milk product that is not subject to development of off flavors encountered with dried whole milk, samples were made up using freshly separated skim milk and a number of fats. Used were: Coconut (hydrogenated and unhydrogenated), and cottonseed, peanut, soybean, and lard (all hydrogenated).

Skim milk was preheated at 150 F. for 20 min., condensed to 35% total solids, heated to 150 F., mixed with fat, homogenized 3 times at 1,000 psi., cooled to 40 F. The following day product was heated to 150 F., spray dried, cooled and sifted. Portions were then air-packed and the cans sealed. Other portions were evacu-

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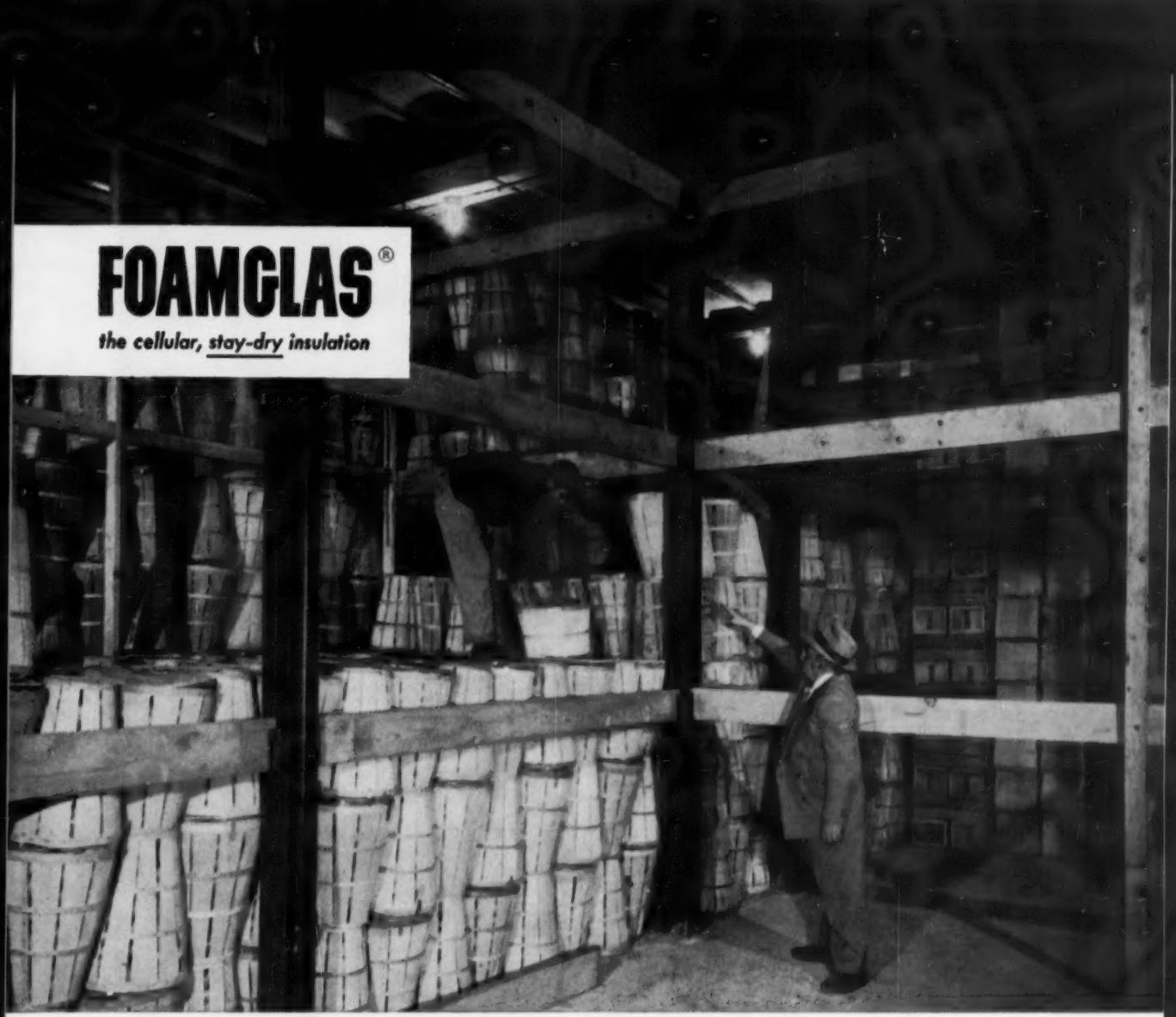

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says John J. Ordille, Manager, South Jersey Produce Cooperative Assn., Inc., East Vineland, N. J.

"Proper curing and storage of perishable sweet potatoes requires exact temperature and humidity control," relates John J. Ordille, Manager, South Jersey Produce Cooperative Assn., Inc., East Vineland, N.J. "Even the heat gain through the roof on a bright winter day could be damaging . . . and condensation inside the warehouse might be disastrous. We rely on FOAMGLAS to prevent such damage to our crops. Here's why:

"FOAMGLAS can't absorb the moisture that cuts the efficiency of ordinary insulations. That means constant, long-lasting insulating performance for unvarying temperature-humidity control and freedom from condensation."

Mr. Ordille concludes: "Our choice of FOAMGLAS proved a wise one during the past storing season. It was a big factor in keeping our crop in perfect condition."

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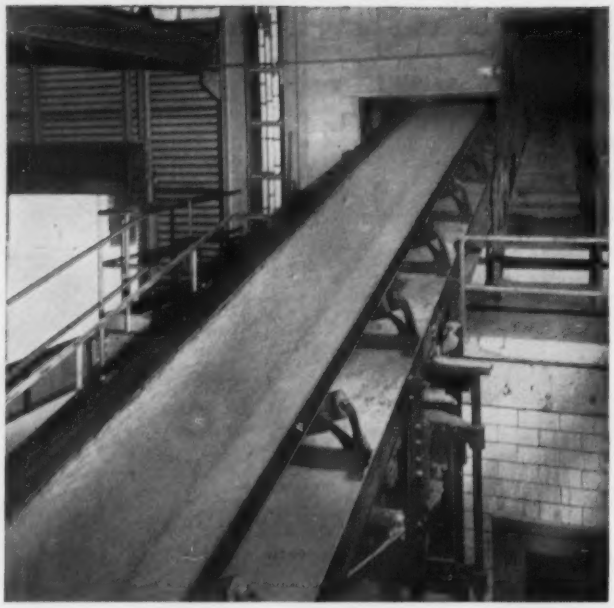

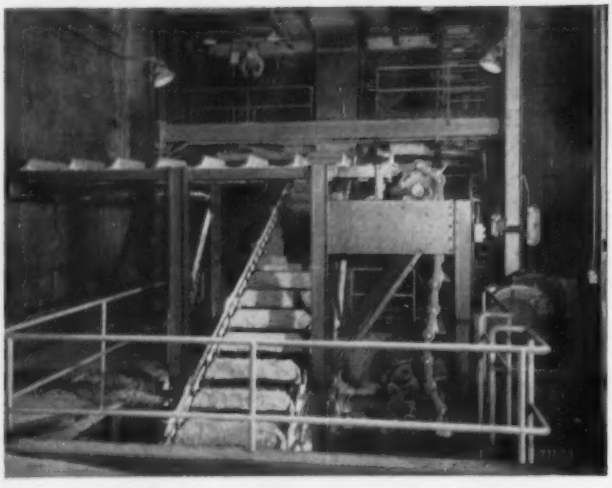

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ated to 25 in. Hg, held 24 hr., then vacuum-packed.

Samples were evaluated by taste-panel after 1, 2, and 6 months storage at room temperature. Dried whole milk developed a stale flavor during the first month; other fat products (except coconut) had oxidized flavors unlike the whole milk off flavor. Vacuum-packed products made with coconut fats retained good flavor for entire test period.—*Journal of Dairy Science*, 640-44, June 1955.

Freezing Changes Structure Of Batter, Cuts Cake Size

Disturbances of the important pattern of fat and air distribution in cake batters during freezing, frozen storage, and thawing, are reflected in loss of volume, and compactness of texture in cakes baked from them.

These conclusions are based on experiments with a high-sugar yellow cake formula. Equal portions of the batter were weighed into round tin pans. Some were baked immediately at an oven temperature of 375 F. Others were covered, frozen at 0 F., and stored at this temperature for 4 and 12 weeks.

Cakes baked from frozen batters became smaller as the period of storage advanced. Texture also changed, becoming increasingly compact with length of storage.

Under the microscope, the fat in freshly prepared batters was dispersed in aerated particles and in thin patches. In frozen batters, air bubble clusters were less numerous. Instead, large isolated ones were dominant as if the clusters had broken or the air bubbles coalesced.

Failure of frozen batters to produce cakes of satisfactory volume and texture appears to be due to breaking of interfacial films that normally stabilize the fat/air and fat/water interfaces—*Food Technology*, 261-63, May, 1955.

Spray-Dried Gluten

Gluten of good baking properties can be prepared by spray-drying an acetic acid dispersion of protein extracted from flour.

First dispersion is made according to the method of Lusena (*Cereal Chem.* 27, 167-8, 1950) in 0.005 *N* acetic acid. It is precipitated with calcium hydroxide and redispersed in 0.01 *N* acetic acid for spray drying. Dispersions had a pH of nearly 5.4 and contained 8-9% solids.

Dried materials (obtained in 24-in. laboratory dryer, inlet air temperature 320 F., outlet 195 F.) contained 15.4% nitrogen, up to 4% moisture. They could be readily redispersed in

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0.1 *N* acetic acid. Baking quality of the gluten was affected by drier temperatures, but, compared favorably with the freeze-dried product.

When added to pastry flours (9.3% protein) the spray-dried gluten increased loaf volume of 100 g. loaves from about 495 ml. to over 800 ml. At 15% protein in the mixed flour the spray-dried product was superior to commercial glutens. At 40% protein, loaf volume was enormous but crumb texture was inferior to that of commercial gluten.—*Canadian Journal of Technology*, 33, No. 4, 256-64, July 1955.

Moisture Content of Flours Affects Life of Cake Mixes

Rate of deterioration of chemically leavened cake mixes during storage is dependent on moisture content and variety of the mixes.

These conclusions are based on experiments in which flours of 13.7, 8.8, 7.4, 5.3, 4.7, 3.2, and 2.6% moisture were used in preparation of white, yellow, gingerbread, and devil's food cake mixes. Storage was at 72 and 100 F. Baking tests were performed after 6, 12, and 18 months at 72; 1, 2, 4, 6, 8, 12, and 18 months at 100. Mixes were analyzed chemically after 0, 6, 12, and 18 months.

Mixes made with 13.7% moisture flours deteriorated greatly at 100 F. and finally became wholly unacceptable. White and yellow mixes made with 8.8% or lower moisture flours tolerated storage at both temperatures reasonably well. However, gingerbread and devil's food mixes made with 8.8% moisture flours deteriorated considerably during 1 yr. at 100 F.

Maximum stability was secured with flour of 7.4% moisture, and additional drying did not improve keeping quality. There was some evidence that mixes made with flours of 3.2 and 2.6% moisture did not withstand storage as well as those with moister flours. — *Food Technology*, 276-85, June 1955.

Extending Storage Life Of Dehydrated Pork

Removal of glucose from ground pork by yeast fermentation prior dehydrating increases storage life of the product.

Washed yeast cells (*Saccharomyces cerevisiae*) in amounts from 1.7-20% were added to ground ($\frac{1}{4}$, $\frac{1}{2}$, $\frac{1}{8}$ in. and comminuted) fresh and cooked pork as a means of reducing glucose content. Approximately 50% was removed in 14 hr. with 5% yeast.

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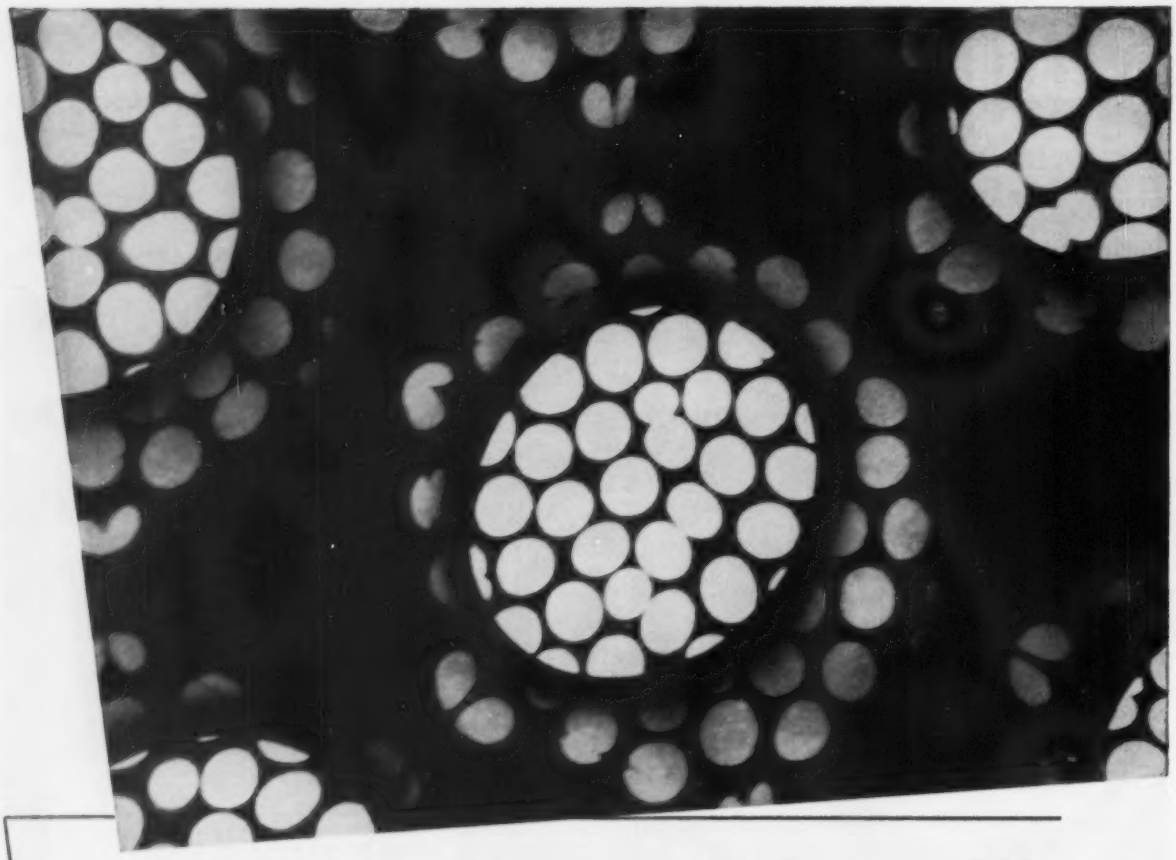

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Fermenting for more than 4 hr. did not significantly improve the dehydrated product. And yeast flavor was usually detected when more than 10% was added. Off-flavors caused by high bacterial populations in raw pork were minimized by cooking prior to fermentation.

Best results were obtained with ⅛-in. grind followed by cooking in a small amount of water, cooling and fermenting 4 hr. with 5% yeast. — *Food Technology*, 290-92, June 1955.

Alginate-Jelly Mixture Protects Fatty Fish

A new method of freezing herring, mackerel, and other fatty fish, which prevents development of rancidity for long periods has been developed in Norway.

In the process, fresh fish are packed in cartons and covered with an alginate mixture having a freezing point below that of the fish. Then block may be frozen in an ordinary plate freezer, and stored at about −5 F.

Freezing mixture comprises a common salt solution to which is added sodium alginate, certain other salts, and a dilute acid (usually lactic). Freezing point is controlled by concentration of salt. Mixture forms a high viscosity jelly that fills all air pockets in the carton and surrounds the fish, thus preventing oxidation.

During thawing block is said to retain its shape, even above 32 F., providing continued protection against oxidation. Tests with round herring frozen in alginate-jelly, fresh water, sea water, weak glycerin, and without water, showed only the ones in alginate-jelly and fresh water satisfactory after 7 months at −4 F. After 12 months storage, the alginate-treated fish were smoked. Their color, flavor and texture were excellent.—*Refrigerating Engineering*, 57, July, 1955.

Value of Truck Insulation Cut by Air Infiltration

Theory, laboratory tests, field examinations show that air infiltration is a major factor in heat gain and moisture accumulation in insulated refrigerated truck bodies.

Road dust patterns in insulation from wrecked bodies indicate that, under the tremendous wind pressures encountered when a body is in motion, air infiltrates through open seams, holes, etc., and passes through and around the insulation and into interior of the body.

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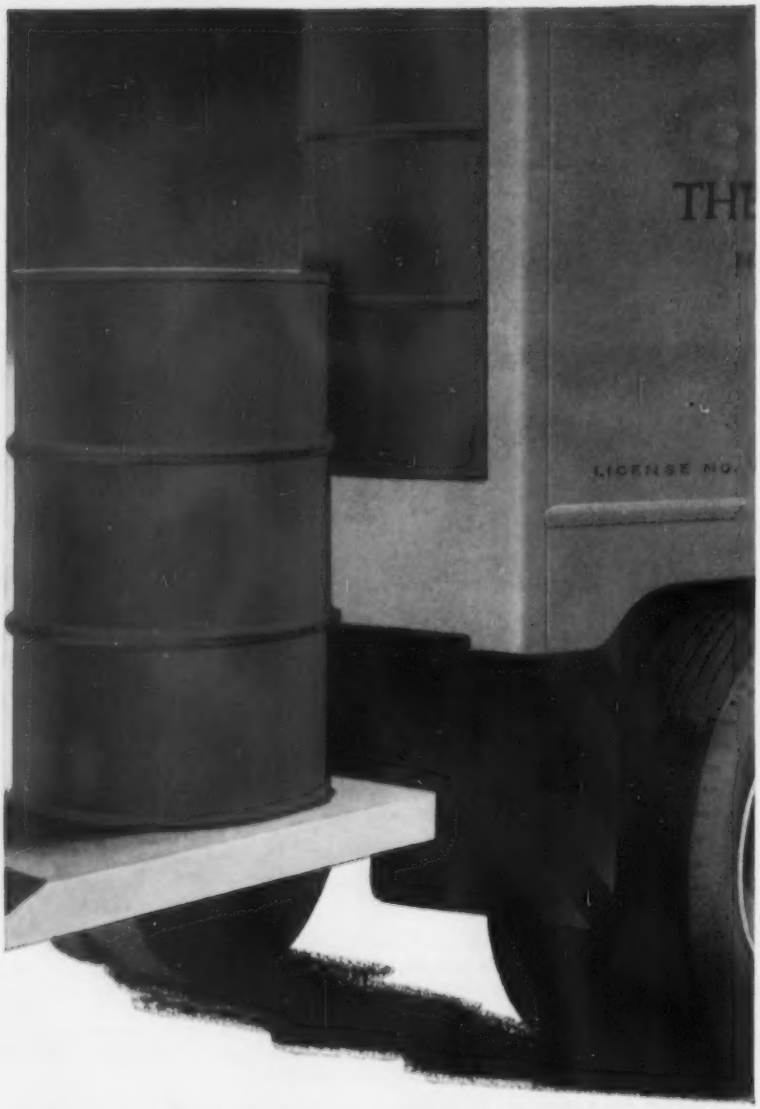

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sulation, water vapor condenses and accumulates as water or ice, thus impairing thermal efficiency, increasing heat gain, and increasing weight of the body.

First line of defense against air infiltration is the outer shell of the body.

Usually this shell is of metal, a perfect air-vapor barrier. Problem then becomes one of sealing holes, seams, and joints. Three accepted methods are: (1) Caulking between laps, under flanges, etc., during shell fabrication; (2) back coating with plastic after shell is fastened to inside surface of outer shell, and (3) air-vapor barrier paper applied either in conjunction with back coating operation or independently. Metal foil laminates are most reliable for this purpose.

Insulating material should have these physical properties: (1) Low thermal conductivity; (2) good air, vapor, water resistance, and (3) sufficient strength to withstand on-the-road mechanical stresses. Also it should be: Reasonable in cost; easy to install originally and during repairs; light in weight. — *Refrigerating Engineering*, 50-56, July 1955.

Apparatus for Rapid Drying

High rates of heat transfer characterize the design of a recently patented drying process and apparatus for its operation.

Process calls for a superheated gaseous drying medium flowing at high velocity, and is particularly useful in rapidly drying heat- and oxidation-sensitive products to a powder.

Apparatus comprises a vertical elongated drying chamber connected by a constricted throat with a lower expansion chamber. Material to be dried and the superheated gas enter at the top of the chamber through suitable valves and nozzles. With introduction of the high-pressure superheated gas, particles to be dried are subjected to high temperature, and evaporation takes place at their surfaces. Cooling effect of evaporation prevents any substantial rise in product temperature.

Drying is practically complete by the time particles have fallen length of chamber; and they are accelerated to high velocity as they pass through the constricted throat to the expansion chamber. Here, solids and gas are separated by centrifugal force, the gas passing out through a vent near the top and the solids being drawn off at the bottom through a rotary air-lock valve—U. S. Patent 2,702,949, March 1, 1955.

The SALES you want...and how sugar helps you hold them

The size of your sales depends on people's attitudes—not only toward your brand, but toward the entire class of products to which your brand belongs!

That's why artificial sweeteners, by implying that certain brands are "fattening" while others "are not", may not motivate people to switch brands but to simply not buy any brand!

And that's why the sugar industry's advertising program, by showing people why they're right in liking sugar and the good things that contain it, helps to strengthen friendly attitudes toward your products—gives people new reasons for buying them.

It also helps to show (see inset) the thinness of the claims on which so many of the stay-thin promotions are based!

The weight you want and how sugar helps you hold it!

It is your appetite that regulates your weight

But if you are healthy your blood sugar level helps to control your appetite

You are hungriest, and most apt to overeat, when your blood sugar level is *low*

When it is *high* you're more quickly satisfied on less food

The food that raises your blood sugar level the fastest is sugar itself

Recent nutritional findings give new importance to sugar and the good foods and beverages that contain it

flummertime is the time when we use the most sugar—in energy-refreshing soft drinks, in ice cream, in glasses of iced tea, on breakfast berries and in fresh fruit desserts.

It is also the season when nature herself puts more sugar in these same sun-ripened fruits and in garden-fresh vegetables—the same kind of sugar she puts in sugar cane and sugar beets.

Yet this is the time of year when most people find it easier to shed surplus pounds.

Science has just recently given us the reason. Sugar plays a part in the healthy body's own weight control system.

Helps prevent overeating

Sugar is known as a quick energy food because your blood sugar level almost immediately [illegible] research scientists have found that [illegible] level also helps to regulate appetite.

When your blood sugar level [illegible] That's your body-cell for energy. [illegible] blood sugar level goes up, [illegible] point your hunger is "[illegible] to turn down extra helpings.

This explains why [illegible] you to stay satisfied [illegible]

In this way nature [illegible] calories you get [illegible]

calories you use up as energy. It's a sort of automatic double-entry bookkeeping system that helps to keep you from getting a double chin.

What if you're gaining weight?

Scientists also found that people get hungry more often during the time when they are actually gaining weight than they do when they're maintaining weight. That is the reason many of the newer reducing diets purposely exclude sugar. Used in "scientific subtlety" it causes the blood sugar level and helps to quickly curb [illegible]

[illegible] a part of your [illegible] break." It [illegible]

[illegible] energy [illegible]

[illegible] [illegible]

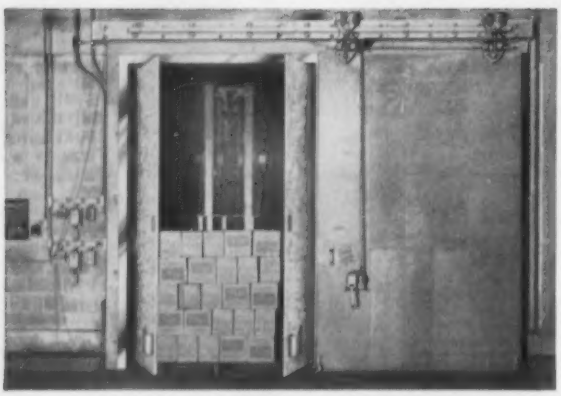
[illegible] [illegible]

[illegible]

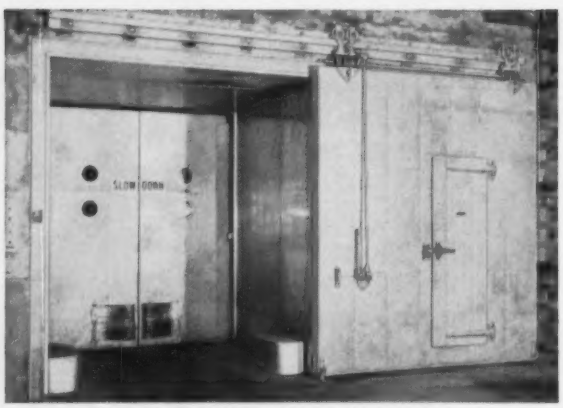
No wasted platform space

Jamison Horizontal Sliding Cold Storage Doors

- conserve floor space
- give tight seal
- permit power operation



Doors for large openings easily supported



Wicket door for personnel passage

Equipped for power operation with remote control

For help on any cold storage door problem, consult your architect or write to JAMISON COLD STORAGE DOOR CO., HAGERSTOWN, MD., U.S.A.

JAMISON

HAGERSTOWN, MARYLAND, U. S. A.

More JAMISON Doors are used by *more* people than any other Cold Storage Door in the world.

Questions & Answers

THIS MONTH'S PROBLEM

Cake Mix Formulas

Question—Can you furnish me with basic formulas for manufacturing white, yellow, gingerbread, and devil's food cakes?

JUNE PROBLEM

Drying Difficult Item

Question—We are faced with the problem of drying a hygroscopic food product to a low moisture content. Our first attempts have been unsuccessful, since the material suffers heat damage as it approaches dryness. Furthermore, there is a considerable dust problem, which is not only a sanitation drawback but represents loss of valuable product as well. We believe there must be a technique for proper drying, but we have not hit upon it. Could you offer any suggestions?

Answer—In order to prevent the heat damage, it seems logical to try to do the drying—at least in the latter stages—with a minimum temperature differential. One of the best ways to accomplish this at reasonable drying rates is by use of vacuum. The higher the vacuum, the lower the drying temperature you can use. In fact, at sufficiently high vacuum (low absolute pressure), it is even possible to dry at less than 32 deg. F.

We suggest that you consult with the manufacturers of vacuum-drying equipment. They will very likely be able to offer you laboratory facilities for small-scale tests on your product in order to establish the optimum vacuum and temperature conditions for the drying cycle.

If you have only small quantities to handle, you might be able to do so satisfactorily in a vacuum-shelf dryer. This type of dryer is available in a wide range of sizes. However, if you have considerable amounts to handle, the labor of loading and unloading the shelves may prove excessive. If so, you will probably need some sort of rotary vacuum dryer, capable of being loaded and unloaded in bulk and having working capacities up to several hundred cubic feet. Some of these have stationary jacketed shells with rotating spiral agitators, while others have rotating jacketed cylinders with internal flights to distribute the product and insure uniform drying.

Since vacuum drying must, of necessity, be carried out in tightly closed dryers, we believe you will find that it will also solve your dust problem at the same time. In fact, dust filters can be provided for recovery of fines, and this will have the desirable effect also of keeping down any fouling of the vacuum pump system.

Chocolate Fudge Icing

Question—How'll I make a chocolate fudge-icing base for the wholesale bakery trade?

Answer—Boil to 230 F., 24 lb. of sugar, ¾ oz. of salt, and 7½ pt. of water. Shut off steam and add 12 lb. of bitter chocolate and 6 lb. of invert sugar. Stir until smooth, and then transfer into mixing bowl. While mixing at low speed, add 9 lb. of powdered sugar (XXXX). When batch stiffens, add 4½ lb. of shortening, 1½ lb. of margarine, and 1½ oz. of vanilla flavor.

Delicate Pumping Problem

Question—One of our food-manufacturing processes requires the elevation and transfer of suspension of diced vegetables in a liquid. We would like, if possible, to find a suitable pump for this operation that would not damage the vegetable particles by mechanical action. Have you any suggestion for such a pump?

Answer—It seems, from your brief discussion, as if your problem might be solved by a recently-announced pneumatic pump. This pump was originally built to handle industrially abrasive suspensions. But it has now been developed for food use, with stainless steel construction and easy dis-assembling for access and cleaning.

Feature of this pump is that it has no rotating parts, and can, therefore, produce no churning action such as would be likely to break tender vegetables. In addition, it needs no lubrication and, although air-operated, it cannot cause aeration of the product being pumped. It is self-priming, and its discharge rate is adjustable simply by controlling the rate of compressed air admission.

Operation is effected by air compressed to about 40 lb. per sq. in., and about 2 gal. per min. can be pumped per cubic foot of air used. Various sizes are offered, with delivery up to 4,800 gph. at 40 ft. head.

In operation, admission of compressed air operates an ejector, which creates vacuum within the pump casing and, thereby, draws in product until a float-operated valve switches over to the discharge cycle. Then, the air, under pressure, pushes on the product surface and forces it out of the casing through the discharge pipe.

Two things should be pointed out if you do attempt to employ this pump. One is that the nature of the solids will probably call for power-operated valves, which are available as a special feature where required. The other is that the compressed air does come into direct contact with the product surface inside the casing. Therefore, it is very important that only absolutely clean compressed air be used. This may call for a separator to remove any entrained oil or water and, perhaps, even a deodorizing filter of the activated-carbon type.

If you do not have sufficient compressed-air capacity to operate this pump, another possibility would be the "torque-flow" solids pump. Though driven conventionally by a motor and having a rotating element, this pump moves the liquid and suspended solids by an induced vortex, and the solids are protected from damage, since they do not pass through the pump rotor itself.

Making Marshmallow Topping

Question—Do you have instructions for making marshmallow topping for the fountain trade?

Answer—Soak 1 lb. of egg albumin in 3 lb. of water. Occasionally stir until completely dissolved, and introduce into an 80-qt. vertical-type beater.

Add and whip until light and stiff: Salt, 2 oz.; tartaric acid (powdered), ¼ oz.; and corn syrup (Sweetose), 5 lb. Meanwhile suspended 1 lb. of con-

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How Would You Do It—

Readers are invited to submit to FOOD ENGINEERING answers to question, "This Month's Problem." Selected answers will be published with credit (unless you specify otherwise). We pay space rates.

What is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

fectioners' starch in 8 lb. of water. Add 10 lb. of corn syrup, bring to a boil with stirring, and continue to cook until clear. Now add 35 lb. of corn syrup, and cook to 230 F.

Remove from heat and gradually add hot syrup to batch while beating at medium speed. Continue beating until desired consistency is obtained and add vanilla to suit. Pack hot into containers.—Formula by A. E. Staley Manufacturing Co., Decatur, Ill.

Lobster Chowder Formula

Question—We manufacture frozen, ready-to-heat-and-serve foods. Included in our line of specialty frozen foods are clam and fish chowders. We'd like to add to this line a superior quality lobster chowder. Do you have formula and directions for making this item? And on a small scale for our test kitchen to try out?

Answer—We've had to work down a test-kitchen type formula from our commercial one. And, if in our "step-down calculations" we've erred a bit, then you can pick up by modifying the formula to suit your requirements.

Following is the formula that was tried out in the home of one of the FE editors, and it is based on a commercial one obtained from a New England firm:

Pick meat from four boiled chicken lobsters, and dice. Now finely dice ¼ lb. of salt pork, and fry out the fat. Dice one stalk of celery, four potatoes, one carrot, and three onions. Add diced vegetables, along with 1 teaspoon of chopped parsley, to salt pork and fry.

Q.—Can you tell me how, in my candy factory, I can continuously feed cast cream centers from melters to depositors that are on the same floor?

A.—Look into the possibility of employing an enclosed worm-screw conveyor or a Moyno pump.

Now add ½ cup of the liquor in which lobsters were boiled and 2 qt. of chicken stock. Also add ¼ teaspoon of poultry seasoning. Simmer until vegetables are tender, add lobster meat, and let simmer for 15 min. Add one small can of tomatoes and ½ cup of cooked rice.

Thicken, by blending, 3 tablespoons of waxy maize starch with 1 qt. of milk. Add milk-starch mixture to chowder, stirring constantly until smooth. Beat in 2 tablespoons of butter. If necessary, you can adjust the seasoning and use additional milk or chicken broth to bring the batch to desired consistency.

Lecithin in French Dressing

Question—Do you have any information on the use of soya lecithin in separating and emulsified types of French dressings?

Answer—At the present time, the Federal Food and Drug Standards do not allow or mention lecithin as an optional emulsifying ingredient for French dressings. If we are to adhere to the standards lecithin cannot be used in French dressings. To the best of our knowledge, none of the companies manufacturing French dressings are incorporating lecithin.

If we are to interpret the standards loosely (since lecithin is in a soybean oil emulsion or solution) we could say that it is allowed since the standards do permit the use of soybean oil. However, the function of lecithin would be for emulsification and the standards do not permit use of lecithin for this purpose.

Q.—What makes chocolate syrup become thick and pasty?

A.—Thickening may be brought about by the syrup losing moisture, cocoa butter crystallizing, and the starch and protein swelling.

It is not intended by this that lecithin would not be a good emulsifier or an advantage. Lecithin is a very good emulsifier, but until such time that we can get these standards revised, we could not offer it for sale in a French dressing.

We thoroughly checked this matter with our Legal Department and feel that our information is accurate. We do not have any information concerning tests in French dressing or anyone using lecithin for French dressing. — W. G. Dahlquist, Manager, Chemical Div., A. E. Staley Manufacturing Co., Decatur, Ill.

Toffee Formula

Question—Do you have a formula for making a brittle toffee with almonds?

Answer—Place in a pan 4½ lb. of dairy butter, and 2 lb. of coconut oil (76 F. melting point). When melted, add with mixing, 1 oz. of lecithin. Mix into batch 10 lb. of granulated sugar and ¾ lb. of invert sugar. Add 1 pt. of water, and continue to stir batch until it boils.

Work sugar crystals from sides of pan, and continue to cook-stir the batch to 275 F. Add 3 lb. of whole almonds, reduce heat slightly, and cook-stir the batch to 295-300 F. Turn off heat, sift into batch 1 level teaspoon of baking soda, mixing rapidly, and promptly pour batch on a lightly oiled, cooled slab. Spread batch to height of nuts.

When partially cooled, turn batch upside down and permit to cool below 75 F. The sheet of brittle toffee is now ready to thinly coat on both sides with milk or dark chocolate. And, as soon as coating is applied, sprinkle finely ground natural or roasted almonds over the surface.

When the coating sets, break the batch up into pieces of the desired size.—*Formula by California Almond Growers Exchange, Sacramento, Calif.*

Brined Wieners Cloud

Question—We manufacture "Smokies"—a smoked sausage product that is brine-packed in large glass jars. In time, the brine becomes cloudy, with the result that a large percentage of our product is returned. Can you provide us with suggestions to eliminate this objectionable, money-losing condition?

Answer—You have a bacterial turbidity problem. What's evidently giving you the trouble is the sugar that's leached out of your brine-packed sausage product. And this sugar is food for the growth of bacteria of the Lactobacilli group, which are not adversely affected by the vinegar and salt in your brine.

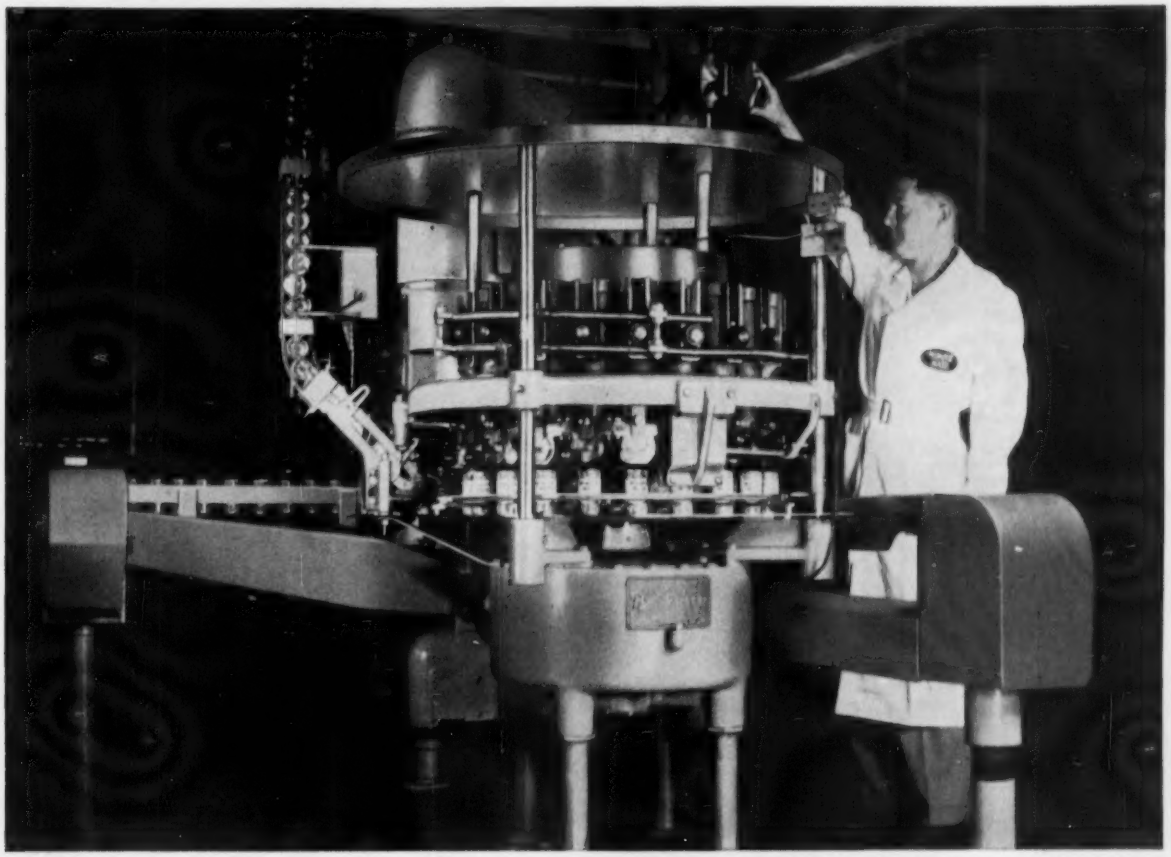
Simplest solutions we can suggest at present is to either cold-rinse your product several times to leach out the sugar before packing into jars or to heat the glass-packed product for ½ hr. at 150 F.

Lift-Slab Construction

Question—We must soon construct an addition to our plant. Presently, we are planning to use it for offices and laboratory so as to free space in the main plant area for manufacturing. We have heard of something called "lift-slab" construction, and are interested in learning whether it would be suitable for such a building and would offer any advantages.

Answer—The lift-slab technique of building construction has been used for light industrial and office construction and, therefore, presumably would be applicable. At present, it is somewhat limited with respect to size of spans that can be used, but we would expect that the allowable 32-ft. spans should be adequate for the offices and laboratory and should cause you no problem.

You do not mention the number of stories in your proposed addition, but the chief benefits of this type of construction are realized with multi-



Speeds as high as 800 containers per minute can be attained on Pfaudler Fillers. Yet design is so simple that only two parts on each filling head need be removed for cleaning.

What **is** the answer to clean, low-cost packaging?

A recent rush of orders for Pfaudler Piston Fillers included such varied applications as potted meat, grape jelly, crushed pineapple, concentrated soups and evaporated milk.

Every product differs in consistency. Each is being packed in containers of various types and sizes at speeds ranging from 20 to 800 a minute.

Yet, every product is filled accurately (usually to a tolerance of ±1/10 of an ounce). Spillage is no problem because every container gets to the piston precisely at the right time and without damage at all recommended speeds.

And maintenance is no problem because only the valves and pistons need be removed for cleaning. It's so simple that one man can clean up a machine in 30 minutes or less. He requires no tools, either. And all parts in contact with the product are corrosion resistant.

The speed with which you handle so many products plus the ease of maintaining Pfaudler Fillers have resulted in some amazing records for economy. We would like to prove this to you. As a starter let us send you our manual. The coupon is for your convenience.

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THE PFAUDLER CO., Dept. FE-8, Rochester 3, N. Y.

Please send me your Bulletin 911, "Rotary Piston Fillers."

Name_____ Title_____

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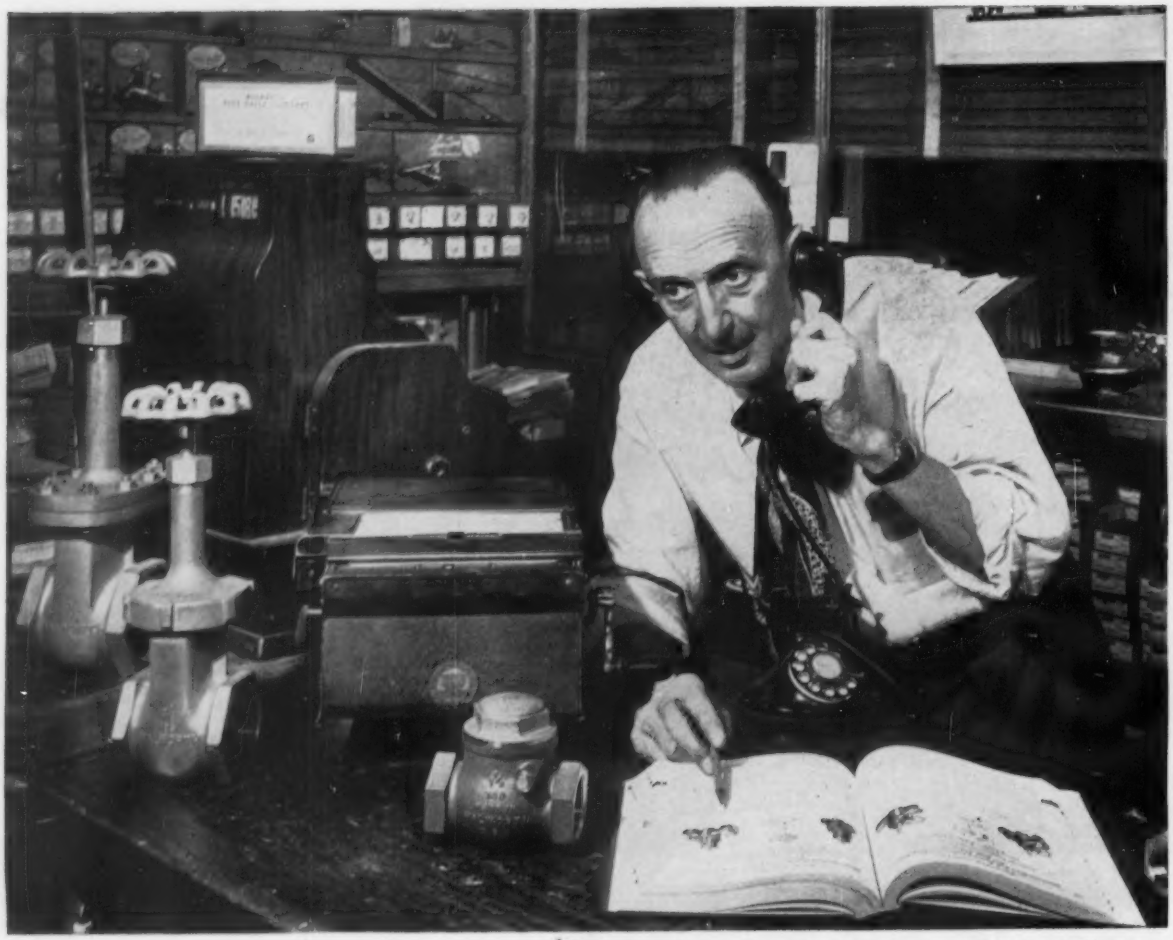
City_____ Zone____ State_____

For more information, use coupon on last page.



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Andy Hansen is typical of Walworth Distributors throughout the nation. He has been a distributor of Walworth Valves and Fittings for years. Like Andy, the Walworth Distributor in your area provides these services and savings:

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story buildings (up to 5 stories high.)

After the columns are in place and the base concrete slab has been poured, it is necessary to allow at least 18 hr. for the concrete to set and remove surface water. Then a separating medium—liquid wax or paraffin—is applied to the entire top surface of this base slab. Lifting collars are set in place around the columns, and reenforcing, electric conduits, stairwell openings, etc. for the next slab are placed. This done, the next slab is poured, directly on top of the first. This procedure is repeated for each story.

After the slabs have cured to proper strength and for at least 14 days, they are hoisted into place by special lifting apparatus, and held in position by welding to the columns.

It will be seen that there are great savings in construction costs by the use of this method. The slabs are poured practically at ground level, and with only edge forms. Thus, the extensive form work of normal multistory concrete construction is minimized, and the hoisting of lumber, concrete, and steel into the air is eliminated. It is also claimed that the efficiency of labor is improved, as so much of the work is done on the ground instead of higher up where workmen are usually not as efficient.

Applicability of the method to a particular project depends upon such factors as number of slabs, number of columns per slab, height of lift, and total footage of slabs lifted. Therefore, it will be well to consult a qualified architect for professional advice on whether this advanced construction method will yield the expected advantages in your case.

Two Mustard Formulas

Question — We are not familiar with the various types of prepared mustard, but we are looking for a cheap blend using chiefly mustard bran and also a better quality yellow mustard. Can you furnish us with directions for making both types of prepared mustard?

Answer — To make the cheaper, really imitation, mustard, grind in a mill consisting of a pair of flat granite stones: Brown mustard seed, 90 lb.; brown mustard bran, 45 lb.; yellow mustard seed, 30 lb.; yellow mustard bran, 37½ lb.; and yellow mustard tailings, 30 lb.

Mill stones should be 30-48 in. dia., with furrows and lines radiating from the center. Lower stone is stationary, while top one revolves at 75 rpm. Clearance between stones is 0.003 in.

Now introduce batch of ground mustard material into mixing tank along with 40 gr. vinegar (white), 240 gal., and spices. Then agitate for about 2 min.

Spice mixture consists of: Salt, 75 lb.; red pepper, 1½ lb.; black pepper, 1½ lb.; white pepper, 1½ lb.; ground clove, 18 oz.; ground allspice, 18 oz.; ground cinnamon, 18 oz.; curry powder, 12 oz.; and capsicum, 3 oz.

Pump batch into a preliminary stone mill (64 rpm.), with stone clearance of 0.003 in., and then into a mixing tank. From mixer, pump mustard into finishing mill (64 rpm.). Batch is finally pumped into storage tanks to age 5 days before filling into jars.

To make a good quality yellow mustard, follow the above directions using this formula: Yellow mustard seed, 396 lb.; water, 213¾ gal.; 120 gr. vinegar (white), 95 gal.; tarragon extract, 4½ gal.; tumeric, 21 lb.; salt, 92 lb.; mixed spices, 3½ lb.; and paprika oil, 4½ qt.

Tarragon extract is prepared by heating to 200 F. in a steam-jacketed kettle 12½ gal. of 110 gr. white vinegar and 3½ lb. of macerated tarragon leaves. Batch is cooled 5 days at room temperature, and strained prior to using.

The mixed ground spices comprise a blend of: Cinnamon, 17.67 lb.; coriander, 8.89 lb.; allspice, 8.89 lb.; cloves, 8.89 lb.; bay leaves, 4.4 lb.; celery seed, 4.4 lb.; caraway seed, 4.4 lb.; mace, 2.2 lb.; and cardamon, 2.2 lb.

Oil solubilized paprika is prepared by heating to 180 F. in a steam-jacketed kettle, with agitation, 10 lb. of paprika and 10 gal. of vegetable oil.

Q.—After our wooden vinegar tanks are emptied, we fill them up with water to prevent them from drying out. Is there anything that we can do to stop the water from becoming putrid?

A.—Open tanks may be filled with limewater. And if the surface film of calcium carbonate is not broken, the tank water will remain "sweet" for several months.

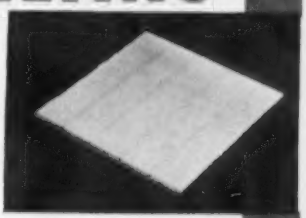
Breaking Up Cheese

Question — We manufacture a Roquefort cheese dressing. Have you any suggestions on an automatic method of breaking up the cheese?

Answer—You did not say anything about the initial size of the cheese that you wish to break up.

Let us assume that you want to break up trim ends and other irregular pieces. If these pieces are no larger than 4 in., then pass through

no guesswork with VICTOR BELTING



Who says *this* belting is *right* for handling your food products? We do . . . on the strength of operating tests conducted by our research department. Customers say so too, because of proven performance. Careful, continual checks of materials assure top workmanship and quality for extra-long life. Performance tests, with your products in mind, guarantee easy cleaning, no residual contamination, and no "belt-taste." That's why—with complete confidence — we recommend for *your* food handling:

VICTOR SUPRENE . . . special-woven cotton duck belting thoroughly impregnated with an exclusive Neoprene compound. Water-proof, highly resistant to grease and most food chemicals, smooth-surfaced, and easily cleaned.

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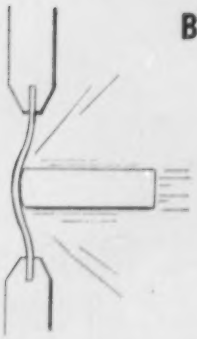
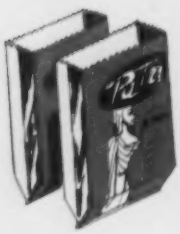
HOW ONE PACKAGING MAN SAVED TWICE HIS SALARY



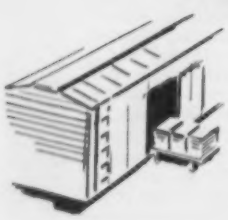
BY CUTTING BREAKAGE LOSSES

Reducing breakage is a T-P specialty. By specifying T-P Quality Shipping Sacks, this expert got extra strength without extra cost. Breakage losses were reduced to a minimum—production increased. (Large quantities of T-P Extra Strength papers are made into shipping containers by other manufacturers.)



BY DESIGNING FOR THE JOB

He found that T-P experts cut his costs by putting modern thinking into package redesign—both from production and appearance standpoints . . . that he received consistant high quality reproduction. (T-P maintains complete design, plate and printing shops staffed by the industry's finest craftsmen.)



BY MAINTAINING STOCK CONTROL BALANCE

He found he had a full line to choose from — from 2 to 100 lbs. in every style and type—one to five walls. He could order as his operations required —mixed carloads to keep his stock control in balance. (T-P has a complete line with special liners—asphalt, polyethylene, clay coated, etc. to suit any need.)

BY SPECIFYING

tp Quality Shipping Sacks

Thomas Phillips COMPANY AKRON, OHIO

For 83 Years a Leading Supplier of Shipping Sacks for Agriculture and Industry

a comminutor for uniform pre-sizing to approximate pea-size pieces. These uniformly pre-sized cheese particles can then be mixed with other ingredients and then run through the same comminutor. However, this comminutor should, at this point, contain appropriate size screens to produce a smooth, thoroughly blended product.

Now let's assume you start with whole cheese wheels. Then, we suggest you manually cut the wheel into approximate 4-in. pieces and proceed as above.

Caramel Corn Formula

Question—We are interested in obtaining a good formula for caramel corn. We have been attempting to make this product, but our present formula, which calls for a high percentage of brown sugar, is not very satisfactory. There is, however, a caramel corn on the market with a golden color and consistency of peanut brittle. Can you assist us?

Answer—Cook in steam-jacketed kettle to 285 deg. F.: Sugar, 12 lb.; corn syrup, 6 lb.; and water, 4⅔ lb. Introduce, with agitation, 3 lb. of butter and salt to suit. Now mix in with batch 20 gal. of popped corn.

Preparing Split Pea Soup

Question—We are currently planning to can split pea soup. Do you have a formula?

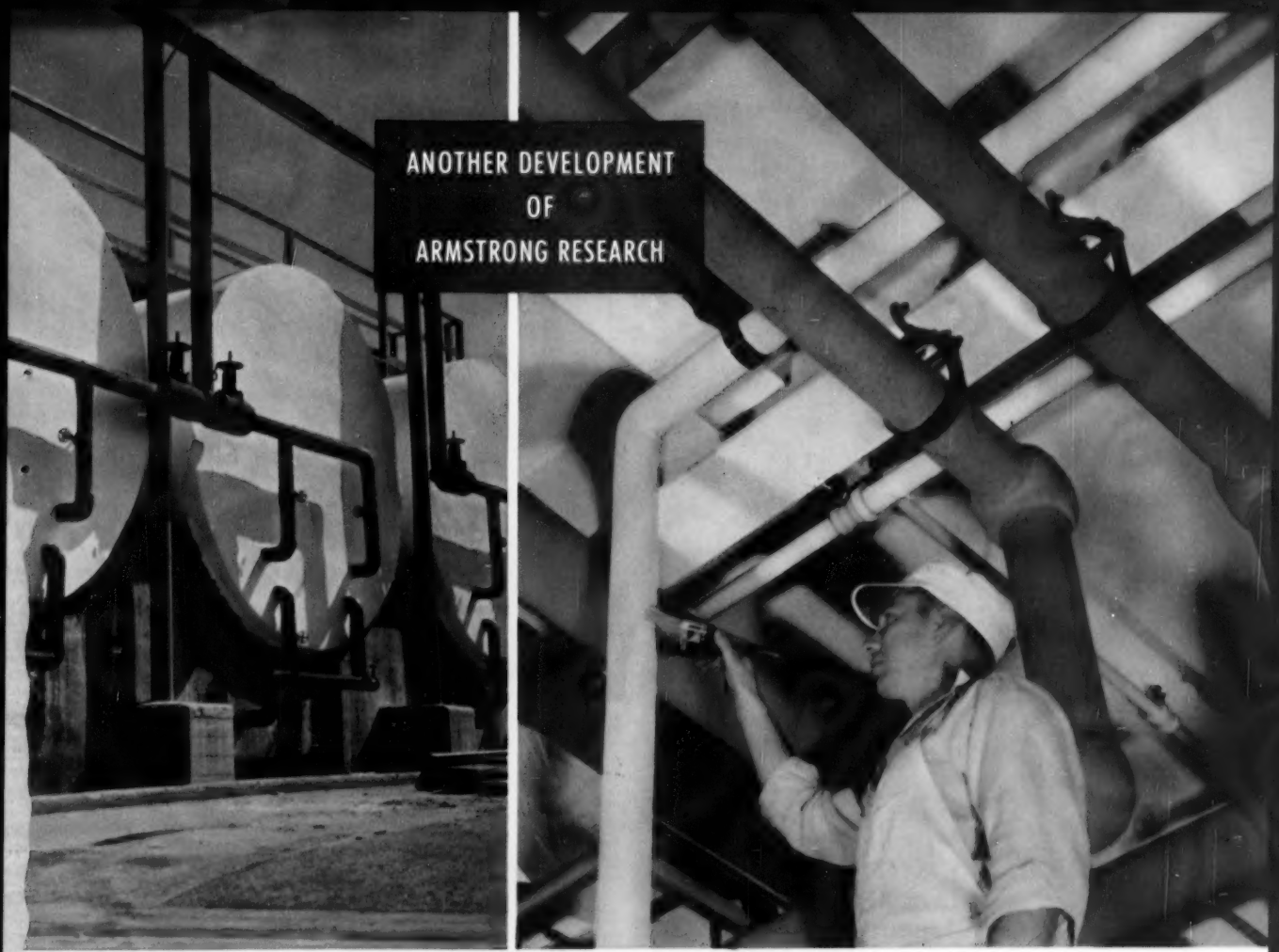
Answer—Soak 12½ lb. of split peas for 12 hr. Then bring peas to a boil and simmer for 2 hr. in 15 gal. of water, along with 6 lb. of ham. Run ham and peas through pulper, and add back to jacketed kettle. Now introduce 20 gal. of vegetable stock, 1 lb. of salt, and ¼ lb. of white pepper (ground).

Vegetable stock is made by cooking in 4 lb. of butter, 15 lb. each of carrots, celery, turnips, and onions. Next added are 15 gal. of water, ¾ lb. of salt, ¾ lb. of pepper, and 1 oz. of mixed spices.

Q.–There are two products we'd like to make–chicken spread and deviled chicken. Can you tell us how?

A.–Finely grind in a silent cutter 16 lb. of chicken skin and meat. Then add, while mixing, 6.4 oz. of salt, 6.4 oz. of diced onions, 0.2 oz. of white pepper (ground), 0.2 oz. of cloves (ground), 0.2 oz. of mace (ground), 25.6 oz. of chicken broth, and ½ lb. of flour.

To make deviled chicken, merely add about 1½ oz. of mustard.



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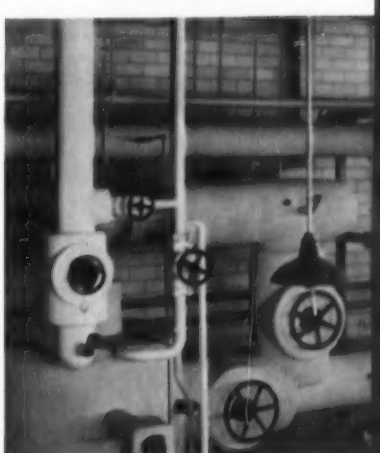

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**All quotations on this page are from a signed letter from Mr. Curyea to the Patterson-Kelley Company, Inc.*

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Cereal Chemists' Topics

—Continued from page 82

naphthalene) extraction method to the quantitative determination of fat in prepared mixes and several of their component ingredients. Fat determinations are rapid, simple, and accurate.

Method has been simplified through use of tables that eliminate preparing standard curves of refractive index vs. percent fat concentrations for different fat systems.

Color-Grading of Flour

Extensive use in Great Britain, the Empire, and a number of other countries, of the Kent-Jones & Martin Flour Color Grader (diagram p. 81) was detailed by D. W. Kent-Jones, noted British chemist of The Laboratories, Dudden Hill Lane, Willesden, London.

He reported that this unit has almost completely superseded the ash test, which he described as indirect, time-consuming, and almost impossible in respect to controlling and checking length of milling extractions analytically.

"Ash tests," he said, "have never been worshipped in England with the reverence you have shown for them in your country." He then referred to the British rule that flour contain 14 oz. per bag (280 lb.) of creta proeparata (chalk), and said that accordingly "the ash test means little or nothing, since chalk mixes in so unevenly with flour."

He went on to state his belief that the advanced British color grader, or another similar instrument, will be used before long in the U. S. and Canada.

The Kent-Jones & Martin unit is a reflectometer utilizing flour in paste form.

It records the results by means of photoelectric cells working on a cut-off mask to register a null point.

On the empirical scale used, said the British chemist, top-patent flours record about 0 to 10 K-J & M units, ordinary straight-run white flours give figures of around 1.5 to 2.5, and the original true 80% flours about 5.0 or 6.0, according to the nature of the wheats and efficiency of the milling.

In comparison the wartime 85% flours were around 7.5 to 8.5.

The entire scale of the instrument goes from −5.0 to 18.0. The test takes about 2 min., and each increase of one K-J & M unit is a reduction of 1.75% in the reflectance.

End (Resume reading on page 83)

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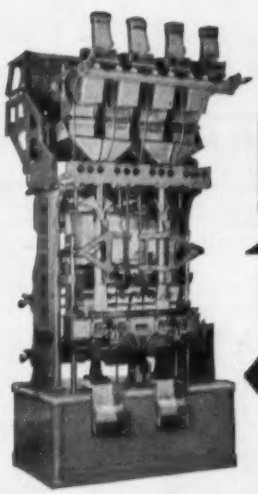

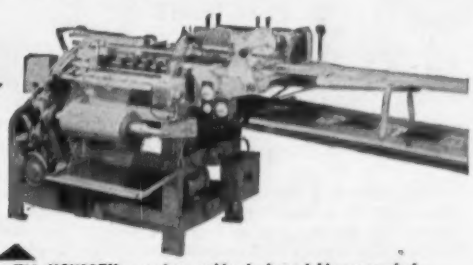

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Personnel Problems Guide

HUMAN BEHAVIOR IN INDUSTRY. *By W. W. Finlay, A. Q. Sartain, W. M. Tate. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York City 36. 1955. 247 pages. 6 x 9¼ in., cloth. Price:* $4.

The result of the popular sessions for supervisors held at the Southern Methodist University's Institute of Management, the book presents a detailed and comprehensive view of the problems of people in industry. What they do, why and how they do it are discussed through real-life examples.

Practical and non-technical, the work is of value to food industry management at all levels. The introduction to the book deals with a newly-promoted plant manager and his problems. Problems of communication, authority, co-operation are covered with many others.

The book is indexed.

Dairying in Britain

DICTIONARY OF DAIRYING *Second Edition By J. G. Davis. Published by Interscience Publishers, Inc., 250 Fifth Ave., New York City 1. 1955. 1132 pages. 5¾ x 8¾ in., cloth. Price:* $10.

A revision and enlargement of the first edition published in 1950, the book is a comprehensive reference work for the dairy industry. Containing the work of Dr. Davis himself and of many well-known dairy specialists, it covers both theory and practice of all branches of dairying.

Published in Great Britain, the book deals primarily with the dairy industry within the Commonwealth. Most of the principles and processing data, however, may be applied to dairying anywhere.

The book is illustrated and each section is supplemented by an exhaustive bibliography.

Office Equipment Guide

INFORMATION PROCESSING EQUIPMENT *Edited by M. P. Doss. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1955. 270 pages. 6¼ x 9¼ in., cloth. Price:* $8.75.

Descriptions and illustrations of all of the major methods of preparing, reproducing, utilizing, and storing of all types of technical information are contained in this interesting and useful volume.

The complexities of paper work in the food industry today will make the work valuable to management. All of the information is up-to-date and comprehensive, supplying details in relationship to what should be known in order to properly utilize the systems.

Such methods as letterpress and offset printing, electric and automative typewriters, collating machines, recording machines, punched cards, and elaborate calculating machines are discussed with clarity and a full understanding of the practical uses and problems.

Each chapter is followed by a full list of references, both to machine manufacturers and to appropriate literature.

Research for Industry

COORDINATION, CONTROL, AND FINANCING OF INDUSTRIAL RESEARCH *Edited by Albert H. Rubenstein. Published by Kings Crown Press, Columbia University, 413 W. 117th St., New York City. 1955. 5½ x 8¾ in., cloth. Price:* $8.50.

Sponsored by the Department of Industrial Engineering at Columbia University, the book is compiled from the proceedings of the Fifth Annual Conference on Industrial Research, 1954, as well as selected papers from the Fourth Conference of 1953. It is the fourth in a series reporting the annual conferences.

Subjects of papers include current status of industrial research, coordination of research with the financial aims of the company, coordination of research with sales, new product innovation and introduction, and many others.

The book is of particular interest in the food industry, where research is all-important in product control and development. Specific chapters dealing with new product development and introduction, coordination of research with sales, and many others are of definite value to the food man.

In addition to the papers presented at the meetings, a digest of relevant and abridged material from the clinic session discussions is reprinted for reference.

Enzyme Chemistry Manual

OUTLINES OF ENZYME CHEMISTRY. *By J. B. Neilands and Paul K. Stumpf. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16. 1955. 315 pages. 6¾ x 9¼ in., cloth. Price:* $6.50.

An ideal treatment of the subject for beginners and non-specialists, the book is divided into four sections. The first covers the history of enzyme chemistry, equilibria and ionization, isolation methods, criteria of purity, and characterization.

The second part discusses the physical chemistry of enzymes, while the

FE REPRINTS AVAILABLE

Difficult-to-find practical information on food plant operations and materials is available in the "roundup" reports and articles listed below. Single-copy reprint prices are given. For orders of 20 or more, there is a 25% discount. You order the reprints by circling the corresponding numbers on the Reader Service Coupon, inside the back cover. You will be billed when your order is filled.

8. Newer Ingredients $1.25
Twenty-page report on the newer ingredients which aid in producing better food products (May, 1952). It includes detailed articles on these subjects: (1) Guide to Optional "Chemical" Additives. (2) Antioxidants Provide New Flavor Controls. (3) Industrial Enzymes Now Speed Natural Processes. (4) Food Emulsifiers Bring New Highs in Uniformity. (5) Seaweed Extractives Find Versatile Uses in Foods. Proper Storage of Your Stock Averts Line Headaches.

9. Quality Control $0.75
Nine-page report on simplified statistical quality control for practical food product improvement (Dec., 1952). New reference-table method is presented. It shortcuts complex mathematics of statistical technique, is especially suited to food plant operations.

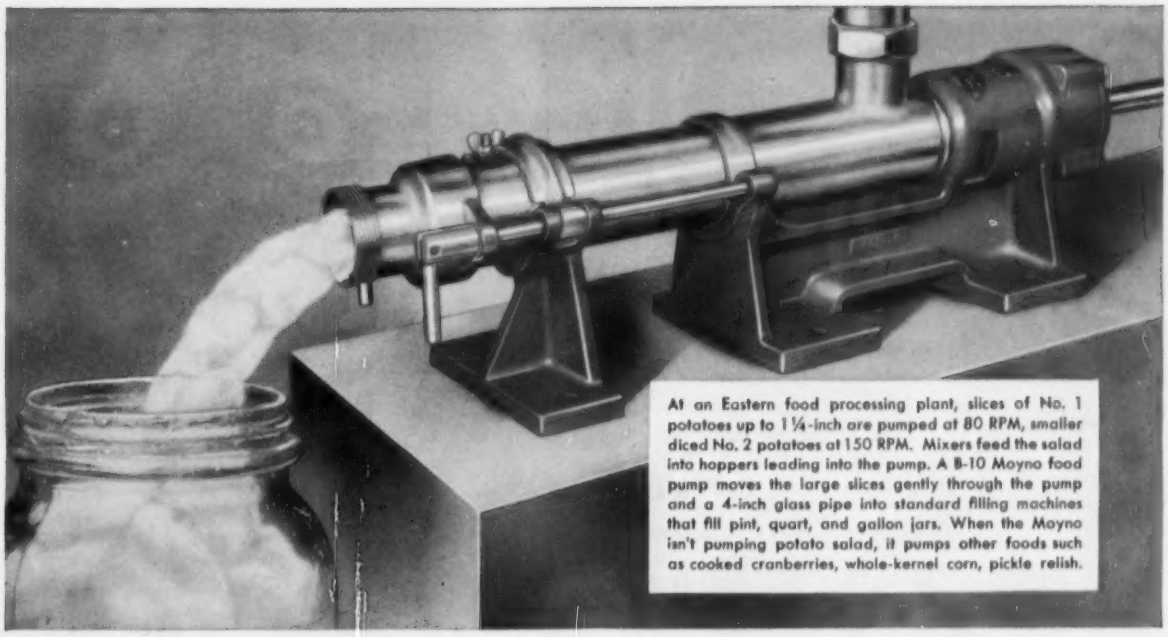
10. Packaging Materials $1.00
Sixteen-page report on how to get better production-line performance with packaging materials and containers (March, 1952). It includes these comprehensive articles: (1) Developing Your Package for High Output. (2) How Properties of Materials Affect Packaging Speeds. (3) Nipping Production Slowdowns by Pre-Checking Supplies. (4) Tips on Ordering Materials for Top Performance. (5)

11. Sanitation $0.50
Six-page report on "How To Assure Top Sanitation in Your Processing Equipment" (Jan., 1952). This report was a preprint of one section of a practical book on food plant sanitation prepared by Association of Food Industry Sanitarians.

12. Materials Handling $1.00
Twelve-page report entitled "How Modern Materials Handling Gives New Spurt in Processing" (March, 1951). Case histories of important savings through more efficient handling are presented. And the different types of handling equipment are described and illustrated.

13. Mixing $0.50
Four-page roundup of progress in plant mixing methods and equipment, plus a forecast of what is ahead (Oct. 1953). Performance data are included as yardsticks of what can be achieved.

14. Aseptic Canning $0.75
Eight pages, including foldout picture flowsheet, describe, evaluate, and illustrate in detail the continuous, short-time, high-temperature aseptic canning process that won the 1951 Food Engineering Award. (June, 1951).



At an Eastern food processing plant, slices of No. 1 potatoes up to 1¼-inch are pumped at 80 RPM, smaller diced No. 2 potatoes at 150 RPM. Mixers feed the salad into hoppers leading into the pump. A B-10 Moyno food pump moves the large slices gently through the pump and a 4-inch glass pipe into standard filling machines that fill pint, quart, and gallon jars. When the Moyno isn't pumping potato salad, it pumps other foods such as cooked cranberries, whole-kernel corn, pickle relish.

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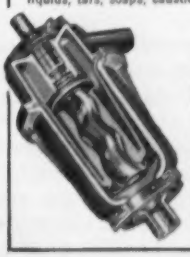

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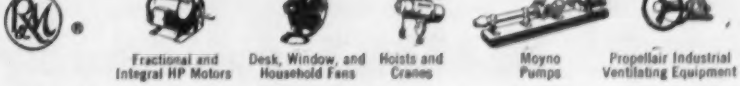

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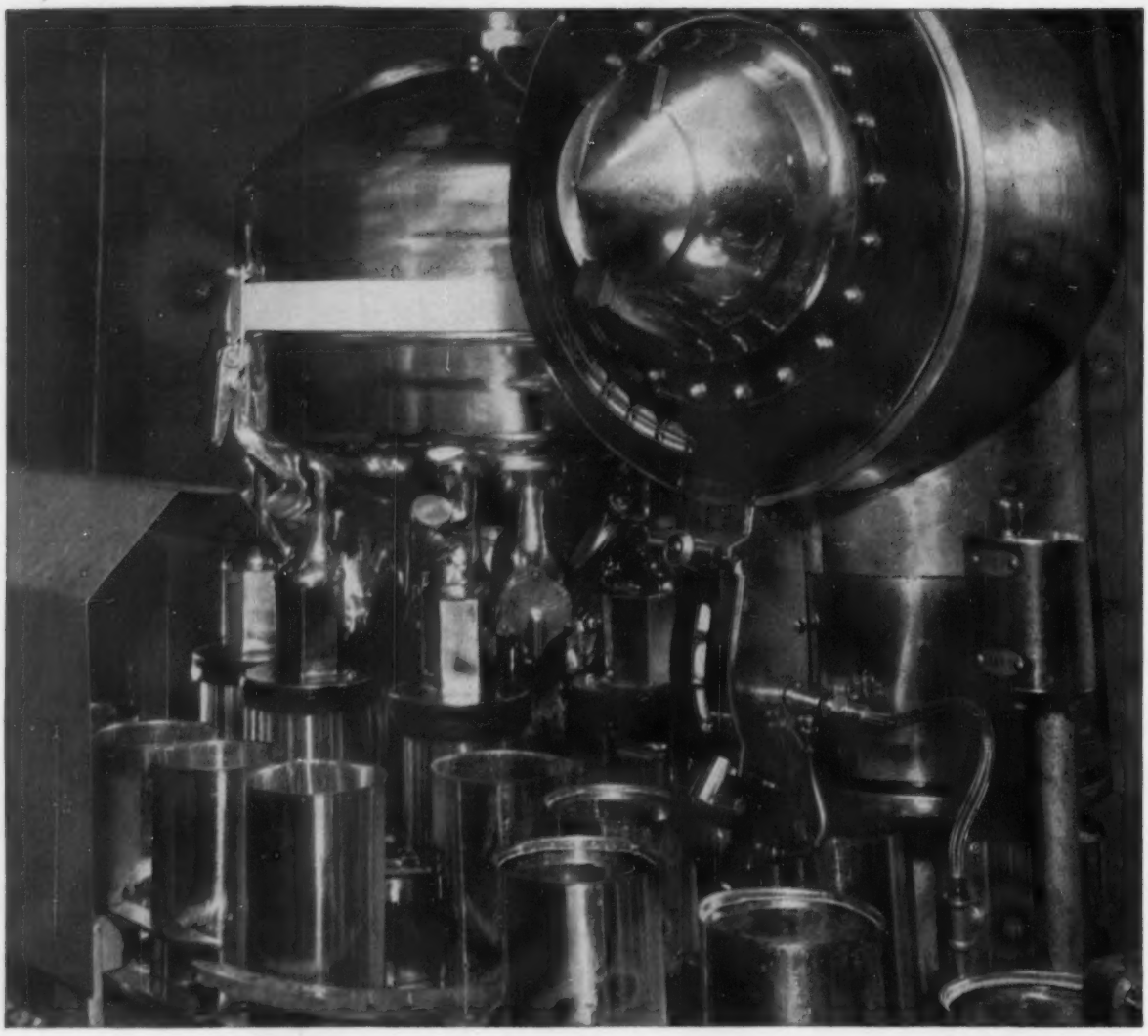

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third and fourth deal with types of enzymes and coenzymes and with metabolic patterns respectively.

The book is indexed and illustrated with charts and graphs.

Equipment Lubrication

BASIC LUBRICATION PRACTICE *By Allen F. Brewer. Published by Reinhold Publishing Corp., 430 Park Ave., New York City 22. 1955. 286 pages. 6 x 9¼ in., cloth. Price:* $6.75.

Directed at aiding the engineer and designer in choosing the most effective lubricant for his equipment, book features a complete coverage of lubricants for bearings, gears, chains, and other types of machinery. Dual viscosity figures are used throughout the book in the many charts and tables, which allow quick and accurate comparisons of lubricants for specific machinery under various operating conditions.

Divisions of the book include operating conditions affecting lubrication, physical tests of petroleum lubricants and their significance, plain or sleeve-type bearings and cams, bearing materials, ball and roller bearings, thrust bearings, gears, chains, wire rope lubrication, flexible couplings, methods of sealing, automatic lubrication, rust prevention, steam turbine service, steam cylinder lubrication, and many others.

Book is illustrated and indexed.

Bulletins and Reports

PRODUCTION AND MARKETING PROBLEMS: A COORDINATED APPROACH *(No. 172 in General Management Series). Published by American Management Assn., New York City. 36 pages, paper. Price:* $1.25. Discussions of inventory control, cost reduction, pricing, and marketing.

FUMIGATION OF DRY BEANS AND COWPEAS ON THE PACKAGING LINE. *Published by USDA, Washington, D. C. Two reports by Stored-Product Insects Laboratory.* Readers wishing to have their names placed on mailing list for series of reports should write Stored-Product Insects Section, USDA, Biological Sciences Branch, USDA, Washington 25, D. C.

WHAT'S NEW ON THE LABOR-MANAGEMENT FRONT? *(No. 161 in Personnel Series) Published by American Management Assn., New York City 36. 50 pages, paper. Price:* $1.75. Review of latest trends, demands, and techniques in labor-management field and implications for personnel executives.

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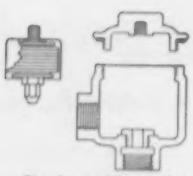

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Atom Weighs Cane

Use of radioactive isotopes for weighing sugar cane while its still in the ground is reported by the Hawaiian Sugar Planters Assn.

"Hot" cobalt, fastened to a pole on one side of the field, activates a geiger counter on the other side to measure density of cane in between with an error of less than 1%. Reading is then translated to a tons-per-acre figure.

Only problem now, says Dr. G. O. Burr, HSPA biochemist, is that cane below furrow tops isn't gaged.

Reports SQC's Vital Role

Statistical quality control played a major part in making and shipping $4.6 billion worth of food products last year, declared F. J. Hosking, exec. v.-p. of Corn Industries Research Foundation, Inc., at the recent New York meeting of the American Society of Quality Control.

This figure was obtained through a detailed questionnaire mailed to leading food manufacturers in the alcoholic beverage, confectionery, canning, citrus fruit, juice and concentrates, meat products, and dairy product branches of the industry.

Food Output to New High

Volume of food-and-beverage production is expected to reach an all-time high this year as a result of increases in both population and consumer income, says McGraw-Hill Department of Economics.

First-half food output is up 1% over same period of '54, due to a substantial rise in processed meat production. It was noted, however, that beverages showed no change.

Milk Usage Climbs

For the first time since 1945, per capita consumption of dairy products last year exceeded that of the previous year, according to Wm. G. Karnes, president Beatrice Foods Co.

In his recent report to company shareholders, he pointed out that this rise, represented primarily by bottled milk, butter, and cheese, was equivalent to a total of about 4 billion pounds of milk.

Food Groups Fight Sugar-Act Change

Twelve national associations, representing food industry branches that utilize 60% of the annual sugar supply, have banded against the proposed changes in the 1948 Sugar Act (FE May, p. 209).

Primary argument is that present cost-outlays for sugar by American industrial consumers run $500,000,000 per year above world market pricing.

Also, it is contended that an increase in the domestic quota would accentuate this excess, since then proportionately less of the cheaper world-market sugar would reach U.S. industrial users.

Meanwhile, the House Agriculture Committee has approved a 4-yr. extension for the present Sugar Act, with major revisions. Under these changes, a rise in the sugar quota would be split 50-50 between domestic and foreign producers. Cuba would get a lion's share of foreign quota at first—then decreasing percentages in following years. Starting next year, domestic growers would have price support at 90% parity.

Group spokesmen urge a comprehensive study of the whole sugar program before legislative action is taken.

Organizations taking part in the protest movement are: American Bakers Assn., American Bottlers of Carbonated Beverages, Associated Retail Bakers of America, Associated Retail Confectioners of U. S., Assn. of Cocoa & Chocolate Mfr. of U. S., Flavoring Extract Mfr. Assn. of U. S., Int. Assn. of Ice Cream Mfr., National Bakers Supply House Assn., National Confectioners Assn. of U. S., National Fruit & Syrup Mfr. Assn., National Mfr. of Beverage Flavors, and National Preserver's Assn.

Reactor Facilities Offered For Gamma-Ray Studies

Effects of neutron-free gamma rays on raw materials and finished goods can now be studied on equipment developed and operated by Gamma Corp., Mansfield, Mass. Interested parties may contract for its use.

Items thus treated do not become radioactive, due to the fact neutrons are absent. Applications include "cold" sterilization and pasteurization.

Immediate use of the privately financed reactor probably will be for research. But it is planned to generate gammas in sufficient quantity and over large enough volumes for some types of production irradiations. Material will be sent in for processing and then returned for evaluation.

Electrostatic Smoking Widely Expanded

Breaking technical chains has won new expansion for the electrostatic smoking process developed by Kingan, Inc., Indianapolis (FE, Sept. '53, p. 70). Company has now modified operation to process hams and picnics (for canning), jowls, plantation squares, pastrami, barbecued ribs, frankfurters, Vienna sausage, turkeys, and cheese. Here, operator hangs 6-lb. hams on conveyor that will take them through chamber to receive electrostatic-precipitated smoke. Meanwhile, there is also word of an overseas development—an installation being projected at Stornoway, Scotland, for time-saving smoking of the traditional kippered herring by the advanced electrostatic technique.

ADSA Weighs Latest Techniques

Specifically highlighted at the recent American Dairy Science Assn. annual meeting at Michigan State U., E. Lansing, were problems concerned with fast sterilization, frozen concentrated milk, cottage cheese, evaporated milk, and drying practices.

Fast sterilization. No more harm is done to vitamins in whole and concentrated milks by heating to 300 F. for 3 sec. than results with conventional pasteurizing processes, according to Dr. E. O. Herriod, U. of Illinois.

He also reported that this treatment does not fully inactivate enzymes present in the milk.

Further data: Cooked flavor disappears in 3 or 4 days. When stored at 40 F., the sterile products remain satisfactory for 3 months, followed by development of stale or oxidized flavors. A carmelized flavor developed in about 2 weeks at 100 F.

Frozen concentrated. Retail distribution of frozen concentrated milk is not promising at the present time, said Dr. R. W. Bell, USDA. He stated that a storage temperature of −17 F. was best for the product.

At this temperature, a 3-1 concentrate will remain satisfactory physically for about a year, and a 4-1 product about 20 weeks. But retention of a satisfactory flavor is the limiting factor. Usual flavors that develop are old and stale.

Cottage cheese factors. Procedures prior to drying, rather than those during the actual manufacture, determine the suitability of dry milk for making cottage cheese, according to the findings of Dr. W. K. Stone, Virginia Agr. Expt. Station.

Heat treatment of skim milk, when greater than 162 F. for 16 sec. before drying, resulted in progressively softer curds. And 172 F. gave a slightly gray-colored cheese. He reported that a check of curd-forming properties and use of whey protein nitrogen tests are valuable in predicting suitability of dry milks for making cottage cheese.

Re evaporated milk. Recent improvements in evaporated-milk practices include strengthening of the "snap end" can, use of electrolytic tin plate, and different methods of sterilizing the product.

Among the sterilizing methods discussed by Dr. E. H. Parfitt, Evaporated Milk Assn., were: (1) The conventional one using 245 F. for 15 min.; (2) an intermediate process of 260 F. for 3 min.; and (3) high-short processes up to 300 F. for 3 sec.

That storage temperatures are of great importance in maintaining original quality is indicated by recent studies in which no changes in physical or flavor characteristics were apparent after 18 months at 40 F.

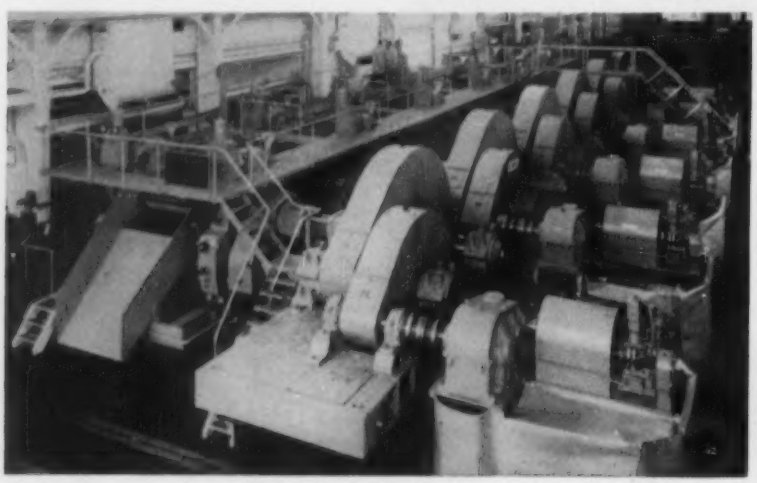
Milk Drying. Units for the drying of milk have always been designed and operated on an empirical basis, said Dr. S. T. Coulter, U. of Minnesota. The three operations involved are atomization, evaporation, and flow of dried particles.

There is a direct relationship between solubility of dry milk and exit air temperature, with temperatures in excess of 210 F. resulting in solubility indexes above 1.

Also, there is a curvilinear relationship between exit air humidity and moisture content of powder. Latter is dependent on rate of flow of milk and air velocity. The larger the particles of dry product, the higher its moisture content.

ADSA'S NEW OFFICERS: Named to lead American Dairy Science Assn. is Dr. I. A. Gould, Ohio State U. (left). Others (l. to r.): Secretary, Dr. H. F. Judkins, National Dairy Products Corp. (retired); Board of Directors, E. L. Fouts, U. of Florida; Vice-President, C. F. Huffman, Michigan State U.; and Board of Directors, I. W. Rupel, U. of Texas.

WENTWORTH HAILED: Honorary Membership Award was given W. A. Wentworth, Director of Borden's industry relations (right), by retiring ADSA President L. A. Moore. Award particularly cited Mr. Wentworth's numerous contributions to product-quality improvement.



Pushbutton Turbine-Powered Sugar Mill

Going into operation at Central Palma, Cuba, is this new giant pushbutton sugar mill featuring six 3-roll mills powered by steam turbines (Worthington). Developing 900 hp., units contain two sets of cane knives and magnetic devices for removal of metal scrap. Individual mill speeds can be controlled separately or together by buttons on remote master panel. Equipment was built by Farrel-Birmingham Co., Rochester, and purchased by Cuban Dominican Sales Corp., subsidiary of West Indies Sugar Corp.

Pass Billion-Pound Mark In Surplus Donations

Distribution of surplus foods to schools, institutions, and needy persons both here and abroad zoomed to a new high during the past fiscal year, reports USDA.

Figures show 1,073,900,000 lb. were issued. This was a total increase of 78% over '53-'54.

Rise in utilization in this country was held to 18%, however, due to the ending of beef-and-gravy movements following exhaustion of these supplies. However, gains in domestic use were reported for all other commodities.

Specific food donations for U. S. and foreign use are given as follows (mil-

lion-pound units): Butter, 131.9; butter oil (foreign only), 46.9; cheese, 76.1; dry milk, 122.2; beef-and-gravy (domestic only), 177.8; dry beans (domestic), 9.9; shortening, 28.9; others, 54.9.

Preliminary outlook for 1955 indicates further increased donations in all commodities except beef-and-gravy.

Hors d'Oeuvres

▶ At year end, Republic Supply Co. gives each employee an itemized check for the annual amount of his fringe benefits with "PAID" stamped across it. Effective reminder of forgotten favors.

▶ **A big 7% of sales is spent on research by members of Packaging Machinery Manufacturers Institute. At that rate they'll soon make your modern packaging machines economically obsolete. And that will be doing you a great favor.**

▶ In ten years, if creative capital flows freely, the standard of living will rise 20 to 25%, Du Pont predicts. Should mean a TV dinner in every lap.

▶ **General Mills has lifted Betty Crocker's face because of psychological connotations revealed by motivation research. In plain English, they made Betty look less like an austere maiden aunt and more like the kind of gal you love to come home to.**

▶ Emulsified polyethylene, says Allied Chemical & Dye, can be sprayed on glass containers by the makers. Outside, it's a protective film. Inside, it makes the product pour more freely.—An answer at last to the ketchup problem!

▶ **The population census clock ticked off 165,000,000 in May. That means 2,700,000 more mouths to feed in a year. Hope you're doing your share.**

▶ A spaghetti advertisement scented with garlic was rejected recently by the New York subway authorities. Probably figured the effect would be lost in the crowd.

▶ **Sale of passion fruit juice soon will be a ten million dollar business, according to an estimate from Hawaii. Eight plants now are processing it. But don't get excited, the name has no biological significance.**

▶ Favorite hobby of Clifton Fadiman, noted literary figure, is collecting and tasting wine. There's a pastime with a punch.

▶ **Workers best improve their living standard by getting a bigger share of the profits —not by producing more. So believe over half the seniors covered in an 86-high school survey. Industry better educate the educators.**

▶ Use of aroma to stimulate food sales at point of purchase may be effective. Yet if applied to all items, the supermarket surely would be a supersmeller.

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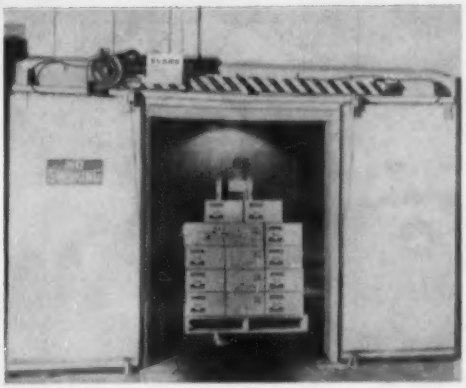
ELECTRIC, COLD STORAGE DOORS



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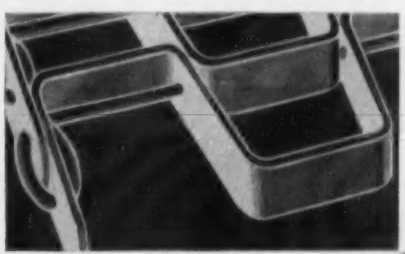

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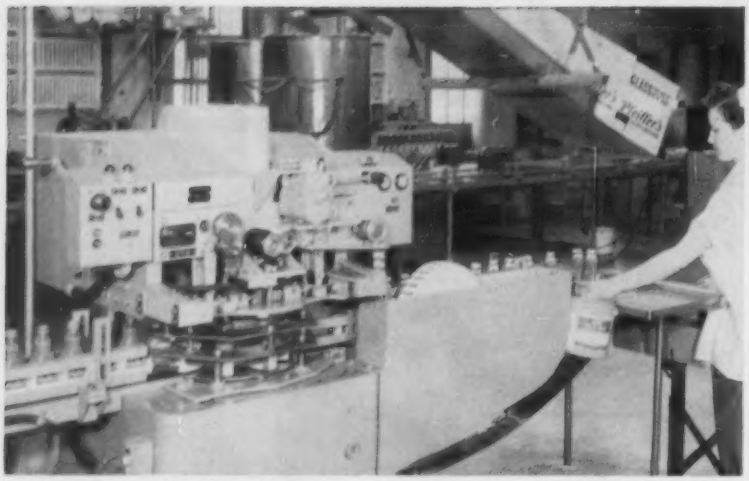


Bottlecap Bander Cuts Labor

This new continuous-output machine (World model) now abolishes costly manual cap banding at Pfeiffer's Food Products, Inc., Buffalo. Taking bottles from labeler, unit applies the printed cellulose closures from roll stock. Correct cut-off is insured by photo-eye controls. Equipment handles over 25,000 bottles a day. It is adapted for fast change-over between 6 and 8 oz. sizes.

Will Freeze Island Fruits

New Hawaiian frozen products will make an appearance in this country following completion of a $50,000 freezing plant at Oahu Cold Storage Co., Div. of Beatrice Foods.

Principle items will be buava, papaya, and passion fruit ice cream bases and a frozen tropical cocktail.

Scan Margarine Status, Diet Aspects Emphasized

Broad problems affecting growth in the margarine field were examined by speakers at the recent national conference in White Sulphur Springs, W. Va.

Noting the marked increase in consumption of the vegetable spread since the tax repeal in '50, Sen. J. W. Fulbright (D, Ark.) pointed out that the product was not yet entirely free in the market.

For example, the Navy still bans its use for table serving, and proposals to sell surplus butter at tax-subsidized prices could, he thought, have a discriminatory effect.

However, he continued, the margarine-vs.-butter controversy is rapidly dying (all but two states, Wisconsin and Minnesota, have removed bans on the yellow product). And today annual consumption of the vegetable spread falls only 1 lb. per capita short of butter. Further, many dairy firms now sell margarine.

Promotion of the product was stressed. Remarking the basic value of "bread and spread," E. E. Kelley, Jr., president, American Bakers Assn., called for an improved natural diet. He termed obesity a psychological and medical problem, and he proposed an educational campaign "to counteract overemphasis on low-calorie diets."

Further, Dr. R. S. Harris, professor of biochemistry and nutrition at MIT, cited scientific data exposing popular fallacies to the effect that fats are indigestible, unusually fattening, and better avoided in hot weather.

Organizations represented at the meeting included the National Cottonseed Products Assn., American Soybean Assn., and National Soybean Processors Assn.

Fishing by "Pushbutton" Seen Halving Crews

"Electronic fishing" is reported possible with device developed by Lektronet, Inc., Seattle.

Fish are attracted to the boat by electrodes powered from a control box.

In experiments conducted with herring in the Pacific, a suction apparatus pumped fish aboard at 1,000 per minute, according to L. M. Dyson, company president. Present equipment uses a generator of nominal size and has demonstrated effectiveness up to 160 ft., he said. It is believed that larger generators would extend the range.

Cost of equipping a boat is estimated at from $5,000 to $10,000. With a Lektronet, says Mr. Dyson the crew can be reduced from the conventional seven to nine men down to four, also smaller nets can be used.

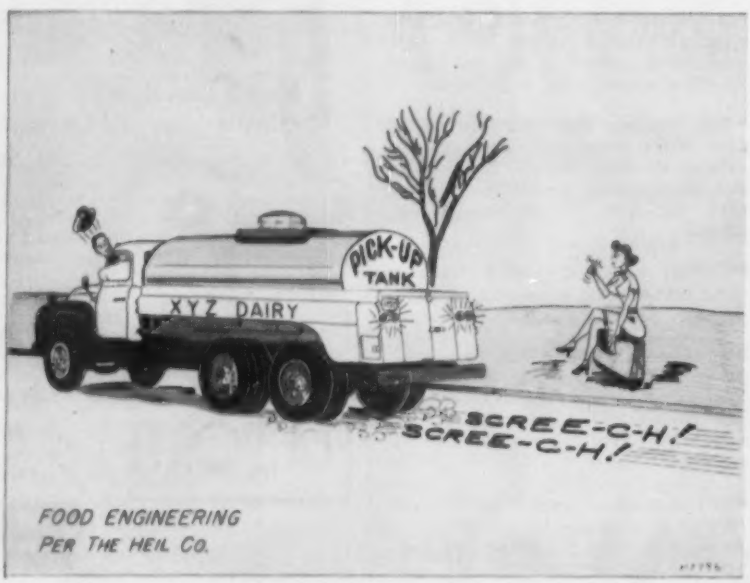
Canned Poultry Hits Peak

AMS figures put canned poultry output for May (latest month) at 22,035,000 lb.—a 400,000-lb. increase over the same month in '54.

This figure is second only to all-time high of 27,562,000 lb. produced in June of last year.

ACS Slates Food Subjects

A symposium on cereals, discussions of water, sewage, and sanitation chemistry, and exploring of industrial uses for dairy byproducts are scheduled at the national American Chemical Society meeting, U. of Minnesota, Minneapolis, Sept. 11-16.



Mayonnaise makers need '999'

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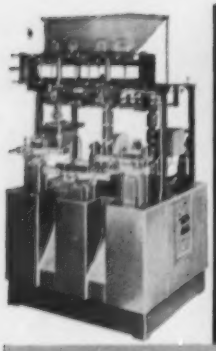

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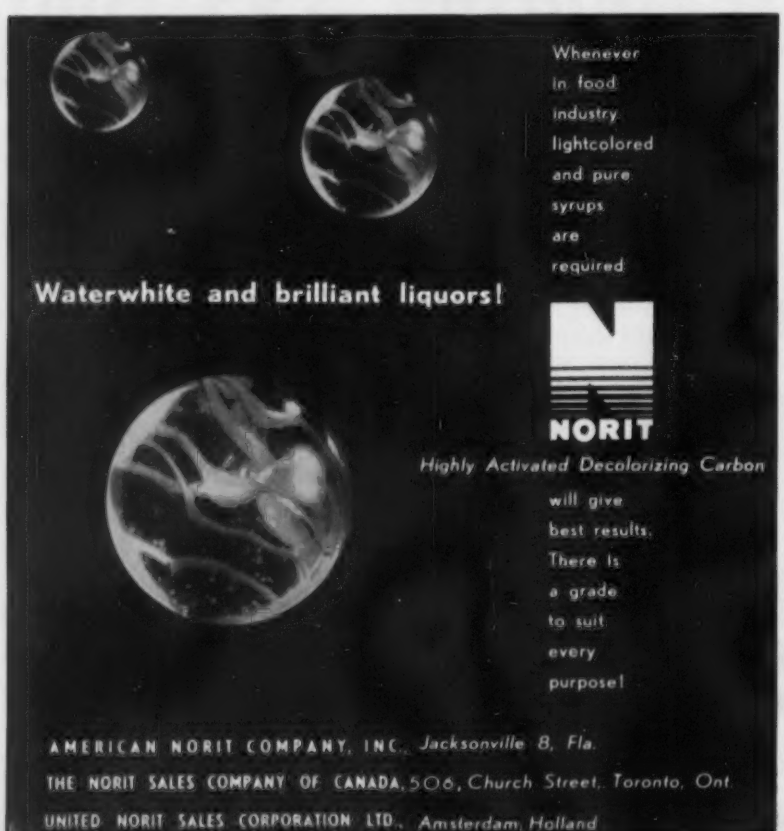
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Honor Society Gives Charters

Chapter-charter presentations was feature of first national meeting of Phi Tau Sigma, food science honor society, held in conjunction with recent IFT annual. Here, president of group, Prof. G. E. Livingston, of U. of Mass. (left), gives MIT charter to Dr. Samuel Cate Prescott. Earlier conclave saw Dr. F. John Francis, of U. of Mass., named executive secretary of society.

Map '55 Test-Marketing Of Aluminum Beer Cans

"Our goal is to test-market 7-oz. aluminum beer cans before the end of 1955." So says William Coors, production director of Coors Industries, which is now completing a 25,000-sq.-ft. pilot plant at Golden, Colo.

European ideas and equipment have been adapted by the company, which hopes to produce a container that will compete price-wise with present tin-coated units.

Uses for other food products will also be sought.

Seen as a help to brewers is the fact that the new can has a 1c. scrap value. For this may minimize litter problems with the empties, and thus solve the attendant public relations problem.

Research has been facilitated by the banding of Beatrice Foods Co. with Adolph Coors Co. to form Aluminum International, Inc., of which Coors Industries is a subsidiary.

EFFA Names Officers

Eastern Frosted Foods Assn. has named following officers: President (re-elected), William A. Bowen, v.-p. of John G. Paton Co.; Vice-Presidents, Earl R. French, v.-p. of Louis L. Libby Food Products, Inc., Max Treewater, Thorman Baum Co., Inc., and Walter Greenspan, Flagstaff Foods; and Secretary and Treasurer (re-elected), Gilbert Augenblick, Hudson Refrigerating Co., and Harvey Osborn, Byron A. Carlson Co.

Enriched Bread Crumbs Offered to Processors

Now available to the fry-and-freeze trade are home-style, vitamin-enriched bread crumbs (General Baking Co.). It is stated they lend themselves to use in process without need for changing batter dip or frying units.

Analysis reveals following composition per 100g.: Moisture 7.0g., protein 12.1g., fat 5.8g., ash 2.7g., fiber .3g., carbohydrate 72.1g., calcium 119mg., phosphorus 118mg., iron 4.7mg., thiamin .21mg., riboflavin .17mg., niacin 3.8mg. Calories are given as 389.

Fishing Status Briefed

Terse gages of current seafood conditions now preface copies of *Commercial Fisheries Outlook*, Fish & Wildlife Service publication.

Here is the late Summer view—Fishery production: Most major fisheries at their maximum level. . .Cold-storage stocks: Slightly higher than average. . .Markets for edible fish: Steady with some weakness due to local oversupply. . .Markets for byproducts: Markets for fish meal unsettled, firming toward end of third quarter. Markets for fish oil and solubles steady . . .Imports: for groundfish, fillets, and blocks, frozen tuna, Northern lobster, and spiny lobster tails, a continued high level. Increasing for canned fish items and frozen shrimp. . .Exports: High for fish oil, and low for other fishery products.

Corrections

In the impact-in-air grinding installation at Foran Spice Co., Milwaukee (FE May, p. 69), a Fitzpatrick mill is used, not a Cog mill. The latter unit, however, has been ordered for use, also, in this type of installation.

Patent number given for the Schoeller Ameliorator, ultrasonic unit used in the chocolate field (FE May, p. 82) was in error. Correct number is U.S. 2,496,557.

Filled bags are sealed, and headers applied, automatically by the Peters Machinery Co. machine illustrated in our Packaging Exposition feature (FE June, p. 87). The picture caption erroneously called the unit semi-automatic.

In the item on Rock Cornish Game Hens put up by Idle Wild Farm, Pomfret, Conn. (FE July, p. 150), it was incorrectly stated that the birds are packed in polyethylene. Actually used for the wrap are Cryovac bags.

In the article "More and Better CO_2" (FE July), the pair of pictures on p. 67 should have accompanied the captions on p. 66 and vice versa.

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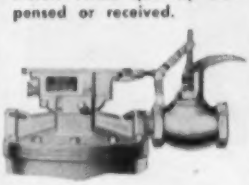

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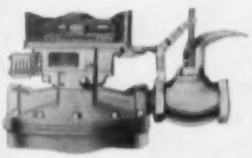

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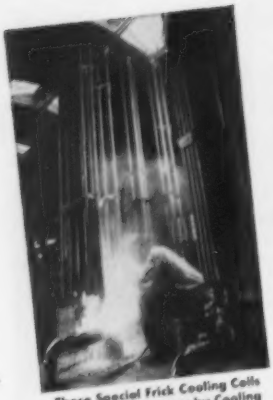

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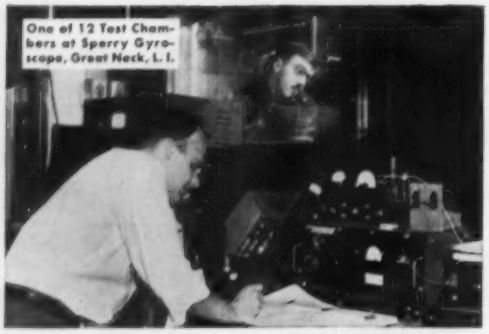

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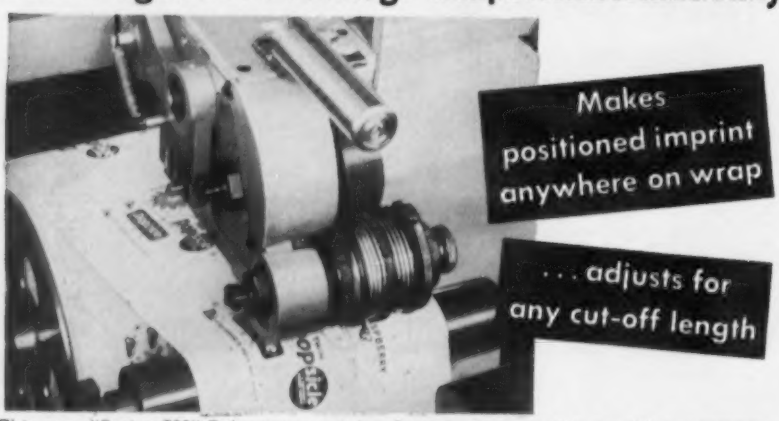

This new "Series 700" Rolaprinter unit by Gottscho answers the need for a compact, precision wrapping machine attachment that prints code-dates, flavors, weights, colors, brands or other identification copy on wraps as part of the wrapping operation. Fully automatic, with its own variable speed motor drive and positioning mechanism, the "Series 700" Rolaprinter unit accurately registers its imprint in any pre-selected location on the wrap . . . can be set for any desired printing repeat. Uses fast-drying, brilliant, permanent flexographic inks to print cellophane, polyethylene, glassine, foil, paper, other materials. Designed for quick copy changes.

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Packaged Beer Rockets, Total Brew Is Off Peak

Home beer consumption has risen phenomenally in the past 20 yr.—going from 31.6% (1933) to 76.7% (1954) of total U.S. volume.

This pinpoints importance of the packaged product to the field, says Research Co. of America in its latest *Brewing Industry Survey*.

Meantime, however, overall volume has dropped, and here RCA names the booming infant population and heavy tax burdens as reasons.

Production rose from 81,305,026 bbl. (1945) to 87,076,141 in 1947, the all-time high. From there, output dropped to a low in 1950 of 82,801,693 bbl.—then jumped back to 86,027,931 in 1953. Latest figure of 83,292,707 bbl. ('54) shows another drop.

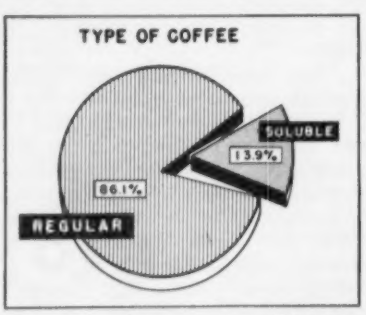
Also noted is a definite trend toward control of manufacture by larger companies, with the top 25 accounting for 62.1% of the volume last year.

Top ten '54 brewers and their production are listed as follows: Anheuser-Busch, Inc., 5,829,000 bbl.; Jos. Schlitz Brewing Co., 5,406,000; P. Ballantine & Sons, 3,713,000; Pabst Brewing Co., 3,500,000 (est.); Liebmann Breweries, Inc., 3,410,000 (est.); Falstaff Brewing Corp., 3,290,000; F. & M. Schaefer Brewing Co., 2,690,000 (est.); Theo. Hamm Brewing Co., 2,249,000; Miller Brewing Co., 2,096,000; and Lucky Lager Brewing Co., 1,775,000.

Hike in '54 Coffee Price Cut Imports, Says PACB

New perspective is given last year's coffee problem by figures that show U.S. '54 imports fell sharply to 17,084,000 bags—18.9% below 1953. This is disclosed by the Pan-American Coffee Bureau in its 18th *Annual Coffee Statistics*.

Reason given by PACB for this drop, and a corresponding one in bean consumption (13%), was the rapid rise in prices and attendant publicity.



Consuming bigger wedge of instant

Meanwhile, proportionate use of soluble coffee is on the increase (see

pie chart). New '55 figures place it at 13.9%–2.4% over 1954.

Also, despite lower bean consumption, the cupwise intake per capita per day has risen (2.60 to 2.67). This hints at a consumer attempt to stretch the "grounds" by adding more water.

Seen for 1955-56 is a marked increase in coffee production, with consumption staying about the same.

Briefly . . .

● **AMERICAN GHEE will be sampled next month by Pakistanians and Indians visiting the Karachi fair. Fairmont Foods Co. of Omaha is supplying initial shipment. U. S. version of "dehydrated spread" is hoped to open an Asian outlet for our surplus butter.**

● DURUM WHEAT, source of semolina, is forecast to top 13,000,000 bu., up from last year's 5,500,000-bu. low that pinched supplies for macaroni makers.

● **MANAGEMENT ASPECTS of packaging and materials handling will get special consideration in the short course being jointly sponsored by Society of Industrial Packaging & Materials Handling Engineers and New York U. Course will run Sept. 19-21 at NYU College of Engineering. Registration is through SIMPHE at 111 W. Jackson Blvd., Chicago.**

● NEW SPEEDY REEFER cars of Railway Express Agency will total 500—a boost from initial purchase of 300. Made by General American Transportation Corp., cars are capable of 100-mph. speeds. Each can take 50-ton load.

● **PRESIDENCY of the National Fruit & Syrup Mfrs. Assn. has gone to S. B. Thomas of Limpert Brothers, Inc., Vineland, N. J. He succeeds A. Melnikoff of Trufruit Syrup Corp., Brooklyn, who was honored with a plaque in appreciation of his work for the association.**

● PROCESSED FRUITS—apples, apricots, cherries, grapes, peaches, pears, and plums—have been luring more and more American consumers away from the fresh forms, say Sidney Hoos and Varden Fuller of the U. of California. They have noted a 20% per-capita drop in use of the fresh between the late '30s and early '50s, while consumption of processed products have jumped 37%.

● **A COFFEE BUREAU has been mapped out by 15 Latin-American nations and the Belgian Congo. Aims are stabilization of the international market, and the promotion of coffee drinking to lift this beverage out of its recent slump.**

● NEW SCIENTIFIC CENTER has been opened by Midwest Research Institute in Kansas City, Mo. A staff of 245 is already at work in the 80,000-sq.-ft. $1,250,000 facility.

● **SARDINES, non-oil canned, featured in a big American export rise in the first quarter of '55. A jump of 523% was chalked up.**

Schedule of Events

August

15–18—International Apple Assn.; Hotel Statler, Detroit.
22–26—National Assn. of Sanitarians, annual educational conference; Sheraton Plaza Hotel, Boston.
28–30—Fancy Food & Confection Show, annual exposition; Hotel Sheraton-Astor, New York City.
29–31—American Soybean Assn. and National Soybean Processors Assn., joint annual meeting; Netherlands Plaza Hotel, Cincinnati.
31–S15—International Congress of Refrigeration, Paris, France.

September

6– 8—American Society for Horticultural Science, annual meeting; Michigan State U., East Lansing.
6–16—Production Engineering Show; Navy Pier, Chicago.
11–16—American Chemical Society, national meeting; U. of Minnesota, Minneapolis, Minn.
12–16—Instrument Society of America, annual conference & exhibit; Shrine Exposition Hall & Auditorium, Los Angeles.
20–22—Industrial Packaging & Materials Handling Show; Kingsbridge Armory, New York City.
21–23—National Assn. of Dairy Equipment Mfrs., fall meeting; The Northernaire, Three Lakes, Wis.
25–28—Master Brewers of America, annual convention; St. Francis Hotel, San Francisco.
26–28—American Management Assn., personnel conferences; Hotel Statler, New York City.
26–30—Atomic Industries Forum, trade fair; Sheraton-Park Hotel, Wash., D. C.
29–1—National Assn. of Bakery Sanitarians, annual meeting; Hotel Senator, Atlantic City.

Action on Standards

Following recent U. S. Grade Standards developments are reported by Agricultural Marketing Service, with references to the *Federal Register*.

Beets, revision of U. S. Grade Standards by Agricultural Marketing Service, June 30 F. R. p. 4617.

Turnips, Rutabagas, revision of Grade Standards, June 30 F. R. p. 4619.

Tangerines, proposed revision of Grade Standards, June 30 F. R. p. 4650.

Dates, proposed revision of Grade Standards, June 30 F. R. p. 4652.

Currants, dried, proposad revision of Grade Standards, June 28 F. R. p. 4545.

Raisins, processed, proposed supplemental revision of Grade Standards, June 28 F. R. p. 4544.

Tangerine, concentrated juice, proposed Grade Standards, June 28. F. R. p. 4546.

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FDA Recommendations

—Continued from page 92

Enforcement should be advisory at the start, and punitive only for flagrant, substantial abuses.

Chemical Additives

In general use in the food industry are additives for such desirable and healthful ends as preserving nutritive values, preventing spoilage or decay, improving appearance, promoting softness, tenderness, or flavor. There are other, rarer cases, however, in which additives may be used solely to disguise inferior quality.

Since FDA is required to preclude use of unnecessary and avoidable poisonous or deleterious substances as additives, it must discover whether they are used and determine need for and effect of use.

FDA requires expert technologists, with modern analytical equipment to create means of identifying additives used.

FDA must devise and conduct lengthy and involved tests to find out whether additives are toxic on both short- and long-term bases. It must determine whether use is necessary and unavoidable.

The agency can inspect just over 10% of the 100,000 establishments in the U. S. where additives may be used in, or on, foods.

All in all, it is becoming more difficult to appraise the additive area, and FDA's personnel and facilities with which to do this work are grossly inadequate.

Since amendments covering food additives have been proposed, some recommendations may, in the future, become superfluous. But in the meantime, the agency should make its standards for the "necessary and unavoidable" and "poisonous and deleterious" wordings of present law as realistic and flexible as consistent with practical needs of health and major economic considerations.

The agency should better publicize to industry its recommendations about additives and how to use them.

Inspection for additive use should be concentrated in segments of the food and food chemical industries that don't have an unwavering policy of integrity and responsibility.

Special Problems

FDA is facing unusual problems in such fields as bakery, cereal and macaroni products, beverages, dairy products, fish, frozen and concentrated fruit juices, poultry and special dietary food.

These are problems caused by volume growth, new products, production technology and marketing techniques.

The burden is too great for FDA's present limited staff. These problems must be checked both to protect public health and economics of affected industries.

On special dietetic foods, the agency should initiate an education program to inform consumers about the nature and quality of these foods. It should also completely revise its 1941 regulations on such products, taking them out of the experimental class.

Pesticide Residues

It is too soon to fully evaluate how well the 1954 Miller Pesticide Amendment will work. Its passage was necessary, however, to protect public against toxic residues carried over to food even after processing.

The agency certainly must obtain facilities and personnel to develop qualitative and quantitative analytic techniques.

It should work with industry to set reasonable and realistic toxicity levels, and inform its field people on how such standards should be applied.

End (Resume reading on page 95)

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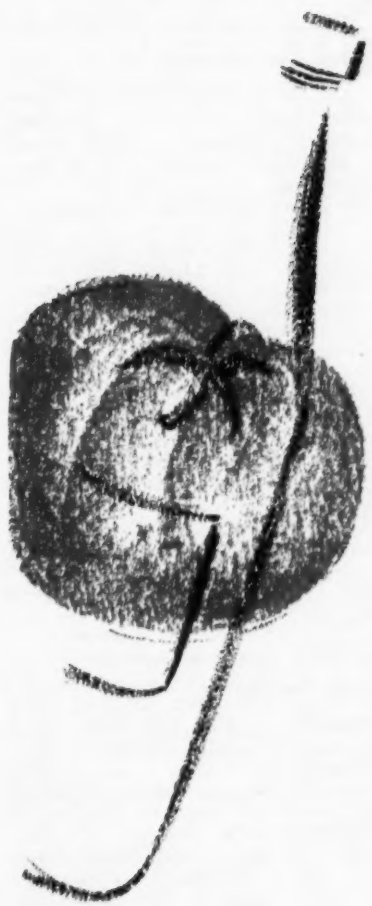

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Recent Inventions

PRODUCT

Boiler-Water Antifoam Comprising Amine Addition Product, Alkylene Oxide–J. W. Ryznar, La Grange Park to National Aluminate Corp., Chicago. No. 2,701,239. Feb. 1, 1955.

Vinegar by Continuous Submerged Oxidative Fermentation of Aqueous Alcohol–O. Hromatka, Salzburg and H. Ebner, Linz, Austria. No. 2,707,683. May 3, 1955.

Malt Beverage Containing Guaiaretic Acid Derivatives as Antioxidant–A. S. Wahl to Wm. J. Stange Co., Chicago. No. 2,708,164. May 10, 1955.

Stabilized Vitamin A Comprising Synthetic Fatty Acid Ester Plus N, N'-Diphenyl-p-Phenylene Diamine–J. C. Bauernfeind, Pompton Plains and L. Magid, Passaic to Hoffmann-LaRoche, Inc., Nutley, N. J. No. 2,708,628. May 17, 1955.

High-Protein Deionized Milk by Treating With Mixture of Anion, Acidic Cation Resins, Adjusting Solids to 30%, pH to 5.8-6.2, Adding Protein–E. G. Stimpson, Sayville and L. K. Riggs to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,708,633. May 17, 1955.

Stabilized Peanut Butter by Roasting Blanched Nuts With Hydrogenated Peanut Oil Having Iodine Value 40-60, Draining, Grinding–W. M. Cochran, Highland Park and J. Carter, Chicago, to Glidden Co., Cleveland. No. 2,708,634. May 17, 1955.

Non-Adhering Sausage Casing Having Chemically-Treated Inner Wall–R. Weingand, Walsrode, and U. Ostwald, Bomlitz, Germany. No. 2,709,138. May 24, 1955.

Soy Bean Product Comprising Cooked, Oil-Free Meal Having 7-15% Water-Soluble Protein, 6-11 Microgram Thiamin per Gram–N. F. Kruse, Decatur, to Central Soya Co., Fort Wayne, Ind. No. 2,710,258. June 7, 1955.

Foodstuff Consisting of Milk Solids Plus Glucosides of N-Acetyl-d-Glucosamine – P. Gyorgy, Villanova, Pa., R. Kuhn and S. Zilliken, Heidelberg, Germany, to American Home Products Corp., New York City. No. 2,710,807. June 14, 1955.

PROCESSES

Recovering Glutamic Acid From Crude Solution by Extracting With Aqueous Alcohol, Separating–E. V. Cardinal, Deerfield, Ill., to International Minerals & Chemical Corp., N. Y. No. 2,707,737. Apr. 19, 1955.

Dehydrating Cooked Potatoes by Freezing at 20-28 F., Drying to Below 10% Moisture in Air Blast–R. M. Mc Cready, R. L. Olson, and W. O. Harrington, Berkeley, Calif., to USA. No. 2,707,684. May 3, 1955.

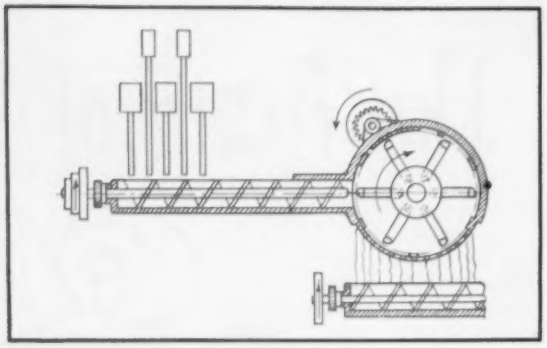
Spray-Drying by Atomizing Liquid Above Upwardly Directed, Rotating Gas Stream–J. E. Nyrop, Hellerup, Denmark, to Niro Corp., New York City. No. 2,707,990. May 10, 1955.

Flocculating Colloids in Cheddar Cheese Whey by Adding 1% Sulphur Dioxide at pH 3.5-4.5, Heating–L. Tumerman, Islip, H. Silvestri, Peckville, and C. Burke, Bayport, to National Dairy Research Laboratories, Oakdale, New York. No. 2,708,166. May 10, 1955.

Extracting Peel Oil, By-Products From Whole Citrus by Simultaneously Washing and Abrading, Distilling Oil From Aqueous Phase, Carotene and Xanthophyll From Flavedo Particles, Drying Residue for Stock Feed–H. A. Toulmin, Jr., to Commonwealth Engineering Co., Dayton, Ohio. No. 2,708,627. May 17, 1955.

Treating Packing House Tankwater to Separate Undissolved Solids, Liberate Fat by Heating to Below Boiling, Acidifying to pH 4-5, Holding–W. C. Davis, Tredyffrin Twsp., Pa., to Sharples Corp. No. 2,708,630. May 17, 1955.

Deionizing Milk by Treating With Mixture of Anion and Acidic Cation Exchange Resins, Keeping Effluent pH Between 5.7–E. G. Stimpson, Sayville, to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,708,632. May 17, 1955.



Makes Chocolate Paste Continuously

Recently patented unit consists of premixing and feeding device that delivers ingredients to hammer mill. Latter comprises hammer assembly, grinding track, rotary scrapers, and drive means. Product discharges to screw conveyor below.—H. K. Wiemer, Wallington, England. No. 2,711,964. June 28, 1955.

Absorbing Lecithin on Anhydrous Dextrose to Yield Dry, Free-Flowing Product–E. R. Neiman, Chicago, to S. Neiman. No. 2,708,631. May 17, 1955.

Processing Meat by Wrapping in Open-Weave, Non-Insulating Fabric, Freezing, Wax-Dipping–D. R. Draper, Detroit. No. 2,708,635. May 17, 1955.

Flash-Drying Heat-Sensitive Foods by Dielectric Heating Under Vacuum–E. J. Rivoche, Wash., D. C. No. 2,708,636. May 17, 1955.

Retarding Oxidized Flavor in Unhomogenized Milk Without Affecting Cream Line by Adding 5% Homogenized Milk–E. H. Freund, Sayville, and A. C. Herro, Oakdale, to National Dairy Research Laboratories, Oakdale, N. Y. No. 2,709,137. May 24, 1955.

Sterilizing Canned Goods With Mixture of Trichloroethylene, Perchloroethylene Vapors–J. E. Voytilla, Kennet Sq., Pa., to E. I. du Pont de Nemours & Co., Wilmington. No. 2,709,139. May 24, 1955.

Dry-Curing Curd Particles Separated From Whey by Rotating, Breaking in Draining Zone.–D. M. Greer, Hinsdale, and J. L. Zink, to Armour & Co., Chicago. No. 2,709,656. May 31, 1955.

Stabilizing Dehydrated Vegetables, Having Natural Fats, With Uniformly Dispersed Antioxidant–T. W. Campbell, Orinda, and G. M. Coppinger, El Cerrito, Calif., to USA. No. 2,709,657. May 31, 1955.

Treating Poultry by Injecting Dressed Bird with 3-8% Aqueous Monosodium Glutamate, Aging 12 Hr. at 32-50 F., Cooking in Broth, Chilling–B. F. Buchanan, Wheaton, Ill., to International Minerals & Chemical Corp. No. 2,709,658. May 31, 1955.

Preserving Citrus by Contacting Fruit With a Thioncarbamate to Retard Fungus Growth –E. S. Blake, Lexington, Mass., and N. R. Piesbergen, Collinsville, Ill., to Monsanto Chemical Co., St. Louis. No. 2,710,259. June 7, 1955.

Heat-Processing Foods by Forcing Cans Down Closed, Liquid-Filled Bath, Sterilizing, Cooling–J. O. Reed, Wash., D. C. No. 2,710,260. June 7, 1955.

Extracting Purified Lactic Acid From Aqueous Solution by Adding Inorganic Salt, Contacting With Organic Solvent, Recovering–E. M. Filachione and E. H. Harris, Jr., Philadelphia, and M. L. Fein, Riverside, N. J., to USA. No. 2,710,880. June 14, 1955.

EQUIPMENT

Syruper Filling Head Comprising Ported Base Plate, Upstanding Cylinder, Main Discharge, Inlet Ports, Reciprocating Sleeve, Vacuum Control Valves, Air Vent–D. W. Bingham, Brighton, Victoria, Australia. No. 2,706,589. Apr. 19, 1955.

Moisture Tester for Granular Materials Having Oven, Revolving Pans, Mixer, Weighing Means–C. W. Brabender, and W. R. Coyne, to Pillsbury Mills, Minneapolis. No. 2,709,914. June 7, 1955.

Brake-Equipped Caster Comprising Wheel, Top Plate, Swivel-Mounted Horn, Brake Shoe, Turnable Cam – M. Kramcsak, Jr. to Bassick Co., Bridgeport, Conn. No. 2,707,794. May 10, 1955.

Dough Transfer Device Having Movable Member Adapted to Move Strip From First to Second Roll Without Wrinkling –F. F. Hansen, Pittsburgh. No. 2,707,923. May 10, 1955.

Citrus Extractor Consisting of Pulp and Juice Hopper, Baffle Plate, Hollow Cylindrical Screen, Rotary Blade–R. J. Trainor to E. E. Crowe, El Monte, Calif. No. 2,707,981. May 10, 1955.

Olive Stemmer Employing Reciprocating Bed of Parallel, Oppositely Directed Sets of Rolls, Gears, Racks–R. M. Magnuson, Campbell, Calif. No. 2,707,982. May 10, 1955.

Meat Cutter With Slidably Mounted Knives Adapted to Cut Six Portions, Actuating Means–H. J. Gumb and N. J. Halverson, Milwaukee. No. 2,707,983. May 10, 1955.

Want more information on any of these recent patents — if so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25¢ for each copy.

Lift Truck With Carriage, Horizontal Load-Receiving Member, Bellows, Spring, Suction Head, Pneumatic Means–W. W. Cushman, Webb City, Mo. No. 2,708,046. May 10, 1955.

Meat Chopper-Plate Cleaner Including Slotted Plate, Mounting Pin, Spring Means, Fluid Pressure Connection – J. V. Longan, Archer City, Texas. No. 2,708,447. May 17, 1955.

Automatic Egg Candler Having Light Source, Receiving Cell, Filter, Conveyor, Control Circuit–G. N. Bliss, Ithaca, N. Y. No. 2,708,515. May 17, 1955.

Cattle-Slaughtering Device Including Vertical Column, Flexible Tension Member, Nostral Clamp, Head-Holding Means–B. Bain, Chicago. No. 2,708,768. May 24, 1955.

Depanner Comprising Discharge Device, Product Catching and Turning Member, Skirt Extension, Chute, Collector–L. S. Hartzog, Sikeston, Mo. No. 2,709,013. May 24, 1955.

Blade Sharpener for Slicing and Cutting Machine–X. B. K. Green, New Paltz, and H. Preble, Jr., Cross River, to General Slicing Machine Co., Waldon, N. Y. No. 2,709,325. May 31, 1955.

Automatic Oven Having Enclosed Baking Chamber, Vertically Spaced Endless Conveyors, Drive Means–J. Eagerman, N. Quincy, Mass. No. 2,709,412. May 31, 1955.

Molasses Dehydrator Consisting of Two Horizontal Rotary Drums Internally Heated, Feed Mixing, Leveling, Product Collecting Means–J. J. Boon, Gronigen, Holland. No. 2,709,487. May 31, 1955.

Dryer Comprising Normally Closed Dehydrating Zone, Communicating Vacuum Chamber, Control Valves–E. J. Rivoche, Wash., D. C. No. 2,709,857. June 7, 1955.

Doughnut Cooker Employing Tank With Longitudinally Spaced, Transverse Elements, Submerged Members–H. T. Hunter, Cantonsville, Md., to Doughnut Corp. of America, New York City. No. 2,709,955. June 7, 1955.

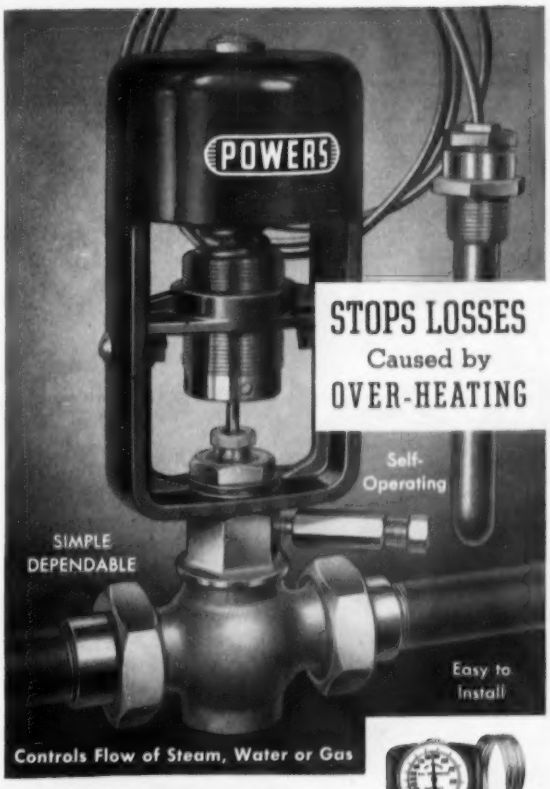
Screw-Conveyor Press Including Housing, Conveyor and Compacting Screws, Feed, Outlet, Recirculating Means–M. A. Napier, Akron, Ohio. No. 2,709,956. June 7, 1955.

Tray Loader Consisting of Conveyor, Synchronized Depositor, Automatic Interrupting Means–H. T. Hunter, Cantonville, Md., and B. W. Wilson, Manhasset, N. Y., to Doughnut Corp. of America, New York City. No. 2,709,974. June 7, 1955.

Filling-Machine Tank With Flat Bottom, Concentric Walls, Liquid Inlet, Rotatable Turret–R. K. Galloway, Hoopeston, Ill., to Food Machinery & Chemical Corp., San Jose, Calif. No. 2,710,024. June 7, 1955.

Sugar Cane Apparatus, for Separating Leaf Trash, Comprising Liquid Reservoir, Flume, Flight Conveyor, Paddle Wheel, Combing Roller, Separating Drum–E. R. Bolles, Oaju, to Hawaiian Sugar Planters Assn., Honolulu. No. 2,710,079. June 7, 1955.

Baking Pan Having Skeletal Sheet-Metal Frame, Foil Pan



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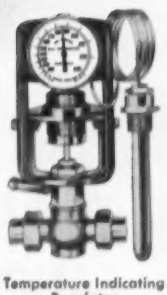
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Cedar Rapids, Iowa

Insert With Marginal Flanges, Ears, Clamps—J. B. Thompson, Kansas City, Mo., to C. J. Patterson Co. No. 2,710,112. June 7, 1955.

PACKAGING

Crimped Bottle Cap Having Flat Circular Top, Downwardly Depending Flange, Alternately Spaced Ridges, Depressions—J. F. Tocco, Brooklyn, N. Y. No. 2,706,572. Apr. 19, 1955.

Multi-Purpose Container, Adapted for Display and Serving, Having Frame, Hinged Dish Member and Covers, Guide Means—A. M. Guior, Brooklyn, N. Y. No. 2,707,379. May 3, 1955.

Liquid Dispensing Envelope Comprising Two Plastic Sheets With Sealed Edges, Central Product Area, Severable Section, Connecting Passage—Y. Kaplan, West Hartford, Conn. and H. M. Ross, Plainfield, N. J. No. 2,707,581. May 3, 1955.

Combined Can Holder, Opener Consisting of Metal Strip With Pointed End, Fulcrum Tongue, Means for Snap-Engaging Upper, Lower Rims—F. W. Petram, New York City. No. 2,707,827. May 10, 1955.

Thermoplastic-Bag Former Including Web Feed, Severing, Sealing, Synchronizing Means—F. C. Binnall, River Forest, Ill. No. 2,707,985. May 10, 1955.

Fruit Carton Having Molded Tray, End Walls, Upper, Lower Rails, Parallel Concave Seating Pads—J. E. Murphy, Hicksville and M. Schnall, Brooklyn to See-Qual Package Corp., New York City. No. 2,708,027. May 10, 1955.

Milk Bottle With Reduced Neck, First, Second Annular Beads, Shallow Annular Recess Adapted to Receive Drippings, Interlocking Cap—E. Sokolik, New Brighton, Minn. No. 2,708,049. May 10, 1955.

Labeller Comprising Rotatable Container Support, Standard, Plate, Label Applying and Pressure Means—E. E. Lakso to Lakso Co., Fitchburg, Mass. No. 2,708,051. May 10, 1955.

Packager for Powdery, Granular, Flaky Material Including Telescopic Open-Topped Pocket, Movable Base, Slidable Members, Air-Pressure Conduit—A. G. Rose, J. A. Kay, and J. Page to Rose Bros. Ltd., Gainsborough, England. No. 2,708,054. May 10, 1955.

Is Space an Important Factor?

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These GMC Pumps are ideal for a multitude of jobs. Smooth and efficient whether vertical, horizontal, up-side-down or any inclination. Low first cost, low power and maintenance costs. Top quality "by Aurora."
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Small Plant Revamping

—Continued from page 65

being used each night—at great cost in materials and labor.

This situation was gradually remedied—first, by stripping all unnecessary sheet metal from the machines, second, by purchasing a common garage "steam-jenny". This portable generating unit was attached to a piping system having numerous outlets where needed.

One man starts work when production stops, using a steam hose. He cleans the plant in 6 hr. at a considerable saving in costs and corresponding increase in sanitation. Condensed moisture is removed from belts and equipment with a large vacuum cleaner.

Maintenance Organized

Paint, metal, and cement—difficult to maintain under severe salt, oil, and steam conditions—gleam at Cornco as a result of new maintenance schedules.

Floors are waxed weekly. Production is shut down two days out of the month to allow for touch-up on paint-peeled areas. Every six months, a four-day break is taken to completely re-do the popper room. Once a year, the entire plant interior gets a coat.

Equipment maintenance is scheduled for the same time. Once a week, motors are thoroughly lubricated. Every month, popper units are torn down for replacement of parts as needed. At every six-month break, all equipment is examined for wear, to avoid costly breakdowns during the production rush.

In connection with this program, it was found that the standard popper gear-box had a life of about a year. A Cornco-designed, ball-bearing, oil-sealed mount, fabricated at a local machine shop for $40, has now been in operation for two years without causing trouble.

Some problems still remain—and may only be solved when the company builds its proposed new plant.

The popper unit, which could be located on the second floor for complete gravity flow of the product, is too cumbersome to be moved.

Corn is presently received in freight-car loads at some distance from the plant. During the peak season (summer), a carload-a-month is used, and extra handling costs pile up as grain is trucked to plant storage.

Popping corn must be kept under carefully controlled temperature and humidity conditions, hence Cornco stores bags in an insulated room that is automatically maintained at 50 deg. F. and 60% humidity. The necessity for keeping large quantities of cellophane in this cooler limits available space.

Brief of Operations

Corn is removed from the cooler the night before and allowed to come to room temperature, to avoid unnecessary chilling of the oil during the cooking operation.

Both wet and dry popping methods (with and without oil) are used.

Corn is dry-popped in a rotary screen unit if it is to go into caramel or cheese-corn products. Wet popping is used for the preparation of the seasoned product, where a butter flavor is desirable.

For this latter operation, coconut oil has proved its worth. Having a higher crack-point than most other edible oils, it is particularly suitable for use in the 400-deg. poppers. Oil is bought with butter color and flavor already added.

Wet poppers are charged with 2 lb. of salt-seasoned corn, followed by 9 oz. of oil. This sequence is necessary to minimize the fire hazard. After 2½ min., the balanced lid of the unit raises under popping pressure and puffed kernels discharge onto a conveyor. Complete emptying of the hinged hopper is accomplished by tipping it forward. A hood passes oil vapors to the stack.

Product then moves to a cylindrical grader, where unpopped granules are

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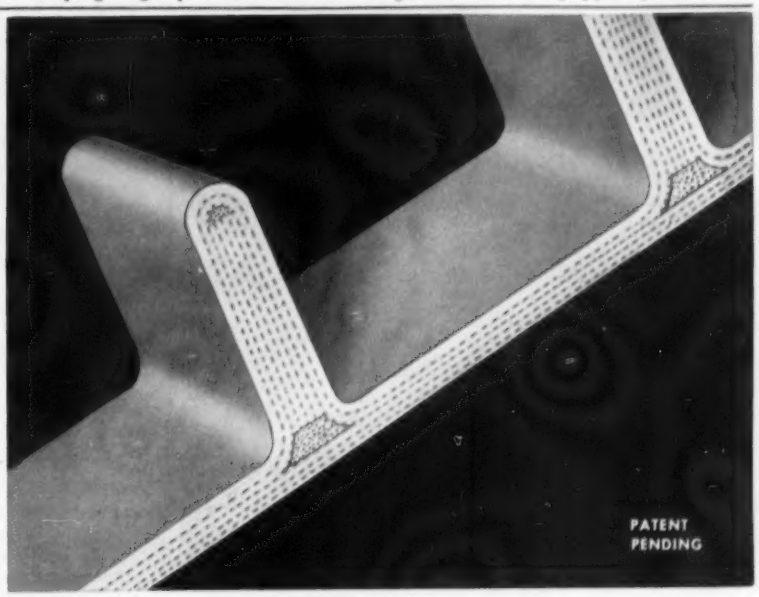
Look at it! It's new! It's tested! It's OK!

Note how the cleats and the body of the belt are one continuous piece, and how the welded wedges and reinforcements, completely vulcanized, become an inseparable part of it. No laps, no gaps, no cracks or crevices. No bolts, no rivets or metal.



Sparks **improved** Cleated Belt can be made any height, width and spacing, and as stiff or as flexible as desired. Will flex around pulley diameters compatible with weight of the belting . . . **This** is **the** belt for food handlers — for sanitation, resistance to bacterial development and easy cleaning.

47 different types and weights available to meet any food processing need. Furnish us with operating data and we will recommend the right cleated belt (the new improved) for any particular requirement.

PATENT PENDING

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- **320 East 8th Street, Oakland, Calif.**
- **1507 Franklin St., Waco, Texas**
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For more information, use coupon on last page.

removed. These rejects are presently utilized as chicken-feed. But since they have a delicious nut-like flavor, the company is weighing their possibilities as a snack food.

Kernels chute from the grader into a 2,000-rpm. blower unit that air-blasts product to second-floor storage hoppers. One hopper (see photo) is equipped to fill popcorn in 5-peck bulk bags (constructed of 40-lb. kraft paper with a 47-lb. glassine liner).

Filled bags are sealed with gummed paper, folded and sealed again across the end to preserve air-tight quality.

For supplying the coated popcorn lines, a second hopper is wheeled under the spiral blower discharge. This one hooks to a chute extending through the floor for the caramel line.

Caramel is made by preheating corn-syrup in a battery of kettles, with addition of brown sugar and water. The mixture is raised to 280 F. or to the smoke point (whichever occurs first). Butter is added during cook.

Fifteen pounds of caramel and 4 lb. of popcorn (one batch) are charged together into a rotary-type mixer and thoroughly but gently agitated. Product is spread in a thin layer on stainless steel tables to cool, stored in fiber drums overnight to complete the process, and packaged the following day.

Cheese mix, prepared on the second-floor in an electrically heated unit, is mixed with popcorn in a rotary mixer and chuted to bagging line.

Cylindrical inserts and a central screw column quickly adjust the cellophane bag filler (Spee-dee) for the various sizes needed to accommodate the different orders. These range from ¾ to 10 oz. packages. All bags are made from No. 300 cellophane in 2-ply construction.

Heat sealed packages are grouped in 12, 24, and 48 package cartons.

Daily production amounts to 500 bags of bulk seasoned corn or 7,800 cellophane packages. In the coated line, 7,200 units of caramel or 3,600 of cheese corn can be turned out. These latter figures vary considerably, depending on the size package being run and on the combination of products run in any one day.

Normally, the plant attempts to run the week's supply of bulk corn during the first two or three days. This reserves the end of the week, after orders are all in, for an accurate production of the coated line.

Very little floor stock is carried, to insure customers obtaining only fresh, quality products.

As for accounting, a compact form sheet—divided horizontally into raw material, supplies, and labor, and columnized vertically by brand names—enables the plant foreman to quickly jot down daily production and costs.

This simplifies compilation of weekly and monthly breakdown sheets, and also gives a running picture of plant operations.

Further, a cost analysis is run on every new shipment of corn. This is part of a program designed to analyze different variety and popping-ratio characteristics.

End (Resume reading on page 66)

Packaging Dry Yeast

—Continued from page 79

gen. Samples of gas, withdrawn by hypodermic needle, are tested either in the standard Orsat gas-analysis apparatus or with one of the electronic oxygen meters operating on the principle of paramagnetism.

Oxygen tests should be made on packets coming off the line according to a regular and frequent schedule. If a significant amount is found, the cause must be immediately determined and corrected.

In addition, packets may be stored and the gas contents thereafter analyzed periodically, until their expiration dates have been reached. This procedure reveals slow leaks.

End (Resume reading on page 80)

Draw from the Nutting Library of Material Handling Helps

Jr. Catalog 54 G—General Purpose, Warehouse Trucks, Casters and Wheels

Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

Bulletin 54-TL—Trucks for Use with Overhead or Under-Floor Powered Conveyors.

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Men & Companies

Industry

Campbell Soup Co. will start work soon on a new mushroom-producing plant near Gazos Creek, Calif.

Carnation Co. has purchased **Mrs. Lees Pies,** located in Los Angeles.

Creamette Co., Minneapolis, is reported to have purchased **Whipette, Inc.** of South St. Paul.

Dixie Lily Milling Co. has purchased a two-acre site in Jacksonville, Fla. for a new wheat blending mill.

Fruit Industries, Inc., of Bradenton, Fla., suffered loss in a fire of its new $500,000 cold storage warehouse.

Fox Head Brewing Co. of Waukesha, Wis., is now controlled by Fox DeLuxe Brewing Co., Chicago organization, formerly known as Peter Fox Brewing Co.

Gerbers Baby Foods Co. has started construction of a cold storage plant in Rochester, N. Y., slated for completion in early Fall.

Great Western Sugar Co. of Denver, beet sugar producer, will not operate two of its nine factories this fall because of drought in northern Colo.

Green Giant Co. is constructing a new plant for **Niblets Brand** whole-kernel corn in Ripon, Wis.

Matthew J. Fox has been elected a director of C. & C. Super Corp. and named president of its newly acquired subsidiary, Western Television, Inc.

Gorton-Pew Fisheries Co., Ltd., Gloucester, Mass., and **Quincy Market Cold Storage & Warehouse Co.,** Boston, will build a new refrigerated warehouse and seafoods processing plant.

Gunther Brewing Co., Baltimore Md., has begun construction of its new materials handling building to cover an entire city block.

Hawaiian Juice Industries has been organized with plant in Honolulu and will be headed by Thomas N. Shaw as president, director and manager.

Holsum Bakery Co., Charleston, W. Va., has affiliated with **Betsy Ross Bakeries, Inc.**

Hunt Foods, Inc., has purchased two glass plants located in Antioch and Vernon, Calif., from **Glass Containers, Inc.,** and also has acquired the facilities of **Nevada Silica Sands, Inc.**

H. W. Lay & Co., Richmond, Va., has purchased **Richmond Potato Chip Co.**

Meletio Seafood Co., St. Louis, has sold its **Fish & Seafood Div.** to Carl Pass.

Miller Brewing Co., Milwaukee, is celebrating its 100th anniversary this year.

Pillsbury Mills, Inc., Minneapolis, sold its Los Angeles macaroni plant to William Kuehn, head of **Food Associates, Inc.,** and Robert William, president of **William's Food Co.**

Rodney Milling Co., Kansas City, has purchased **Blair Milling & Elevator Corp.,** Atchison, Kan.

Seymour Foods, Inc., Topeka, Kan., has expanded its research and testing facilities.

Taylor Wine Co., Hammondsport, N. Y., has become a corporation.

Thomas Lipton Co. will transfer its soup and dessert packaging operations from Hoboken, N. J., to Albion, N. Y.

Correction: It was reported in this column in July that Consumers Yeast Co. is located in Milwaukee. It is actually in San Francisco.

Warren Newcomer, former vice-president, has been elected president of Wilbur-Suchard Chocolate Co., Inc., of Lititz, Pa.

Milton Mumford, who was elected to Lever Bros. board two months ago, has been named executive vice-president of the company.

Personnel

James H. Beaumont has been named director of public relations of A. E. Staley Mfg. Co.

William Berdick has been appointed general manager of Chock Full O'Nuts Corp.

Thomas Bonnitt has joined the Commercial Development Dept. staff of Nat. Dairy Research Lab., Inc., in Oakdale, N. Y.

J. O. Bowen and **George L. Smith** have been named vice-presidents of Southern Dairies, Inc.

William Brittin has been appointed plant manager of food operations for Beech-Nut Packing Co., Canajoharie, N. Y.

Thomas W. Chrystie has been elected a director of American Sugar Refining Co.

Edward Freeman has been appointed vice-president and vice-chairman of the board of Refined Syrups & Sugars, Inc., Yonkers, N. Y.

Bernhard Illfelder has been made director of production for Frost-O-Fast products of Basic Foods Sales Corp. of Englewood, N. J.

Alan Katzenstein is new food technologist and supervisor of quality control dept. for Excelsior Quick Frosted Meat Products, Inc.

R. B. Kelley has been appointed executive secretary of Colorado Grain, Milling & Feed Dealers Assn.

Raymond Kenard has been elected director of budgets for Consolidated Foods Corp., Chicago.

William McKenney has been promoted to director of marketing for John Dulany & Son, Inc., Fruitland, Md.

A. L. Powell has been named director of public relations for Pillsbury Mills, Inc.

O. E. Sette, director of Pacific Oceanic Fishery Investigation in Honolulu for Fish & Wildlife Service, is heading a new research study on West Coast to relate fishing production to climate and ocean conditions.

Dr. Walter E. Snyder has been named director of quality control for Chicago-Central district of Borden Co.

James J. Tormey, sales manager of Lyndonville Canning Co., Inc., has been elected president of Processed Apples Institute, Inc.

Luben Vichey is new president of Tivoli Brewing Co., Denver, succeeding **Jack Waldner,** now executive v.-p.

E. L. Shaw, of **Hills Bros. Coffee, Inc.,** is new president of the Pacific Coast Coffee Assn., headquartered in San Francisco.

Frank C. Schell, Jr. has been named director of The Quaker Oats Co.'s newly created product development dept.

O. L. Thomas has been chosen for newly-created post of general manager of Davidson Baking Co.'s plants in Portland and Eugene, Ore. He was formerly production manager for San Jaoquin Baking Co., Fresno, Calif.

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in any desired proportion
right where you need it.
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John E. Morrill, president of Union Machinery Co., Joliet, Ill., has been reelected president of Bakery Equipment Manufacturers Assn.

Jess Waston has been named vice-president of Lucky Lager Brewing Co. and will direct sales activities in Northern Calif., Northern Nev., Hawaii and the Far East.

Claude Webster is now a vice-president of National Tea Co., Chicago.

Associated Industries

American Can Co. has begun construction of a new factory in Arlington, Tex.

Horace Blackman Co. and its manufacuring affiliate, **Blackman Plastics, Inc.,** have created an experimental-developmental section.

Borg-Warner Corp., Chicago, has elected E. S. Russey and A. W. Rose vice-presidents.

Container Corp. of America has promoted Thomas Cass to senior vice-president of its subsidiary, **Calif. Container Corp.**

Cellu-Craft Products Corp., New Hyde Park, N. Y., has appointed Harry Block advertising and sales promotion manager.

Crane Co. has elected Frank Elliott president.

Colgate-Palmolive Co. has named William Lee Simms II president.

Continental Can Co. has started construction of a new plant in Midland, Mich.

Crown Cork & Seal Co., Inc., Baltimore, has appointed George Crabtree executive v.-p.

Crown Zellerbach Corp. and **Gaylord Container Corp.** are negotiating a merger through exchange of stock.

Dow Chemical Co. has begun production in its new plant in Freeport, Tex.

Foil Kraft, Inc., has elected Joseph Hunter and Elden Smith directors.

Olin Mathieson Chemical Corp. has named William Foster executive v.-p.

Michigan Steel Casting Co. has acquired **Standard Alloy Co.,** Cleveland, and will operate both companies under name, **Michigan-Standard Alloy Casting Co.**

Owens-Illinois has broken ground for a new glass container manufacturing plant in Portland, Ore.

S & S Corrugated Paper Machinery Co., Inc., New York City, has elected Mitchel Flaum president.

Permiglass Div. of A. O. Smith Corp. has made C. L. Hewitt, Jr., manager of heating products.

Society for Advancement of Management has named Francis Bradshaw president and John Joynt executive vice-president for 1955-56.

U. S. Steel Corp. has started production in its new plant in Pennsauken Township near Camden, N. J.

Waxed Paper Institute, Inc., and **Waxed Paper Merchandising Council, Inc.,** have appointed Laurence Herman executive director of both organizations.

National Container Corp. has named William J. Prudler vice-president and assistant general manager of Pacific Coast Operations.

Vulcan Containers, Inc., of Bellwood, Ill., has been formed by consolidation of **Vulcan Stamping & Mfg. Co.** and **Vulcan Tin Can Co.**

Deaths

John Coyle, 65, vice-president and treasurer of Carnation Co., Ltd., Canada—June 22.

Louis Huge', 65, president of the Huge' Co., Inc., and American Sanitation Institute—July 9.

French Jenkins, 64, former general manager of Le Choy Food Products—June 14.

Just Off the Press

New Catalogs and Bulletins from manufacturers of equipment and supplies —Free For The Asking—

PLANT ENGINEERING

Tramp Metal Detection

Shows equipment for detection of tramp metal in bulk, packaged, and liquid food materials. Brochure 3R2565, 6p.—*Radio Corp. of America, Camden, N. J. (201A)*

Compressed Air Separators

Details uses of cyclone separators and after-coolers to remove oil and water vapor from compressed air. Specifications and installation information given. Bulletin 711, 12p.—*R. P. Adams Co., Inc., Buffalo. (201B)*

Vacuum Pumps, Compressors

Considers specifications and applications of several vacuum pumps and compressors. 7p.—*Lammert & Mann Co., Inc., Chicago. (201C)*

Tile Conduit for Piping

Concerns use of tile arches and concrete slabs for underground piping-conduit. Charts list available sizes. Diagrams illustrate construction. Bulletin 10154,—*Porter-Hayden Companies, Newark, N. J. (201D)*

Duct Calculator

Slide-rule-type calculator provides data for gas-collection ducting. Relates gas volume and velocity to duct size, friction loss to velocity and size, round diameter to square measurement.—*Ducon Co., Mineola, L. I., N. Y. (201E)*

Pinch Valves

Describes and pictures line of rubber pinch valves for abrasive and corrosive use. Valves feature quick and tight closing, can be set for any given flow, and are made in hand and remote operated models. Catalog 1154, 6p.—*RKL Valve & Mfg. Co., Philadelphia. (201F)*

Chemical Service Pump

Specifies a line of rotary displacement and centrifugal pumps for chemical service. Models available in stainless steel, synthetic rubber, and bronze, with interchangeable synthetic impellers. 2 p. —*Eco Engineering Co., Newark, N. J. (201G)*

Aluminum Handbook

Comprehensive, 3-section book details process applications, performance with chemicals, and design features of aluminum. *Process Industries Applications of Alcoa Aluminum*, 80p.—*Aluminum Co. of America, Pittsburgh. (201H)*

Bulk Storage Bins

Outlines features of horizontal bulk storage bins. Standard model measures 11 x 24 x 8 ft. and holds 400 cwt. Two bottom screw conveyors move materials. Special models available. Bulletin 549, 2p. —*Day Co., Minneapolis. (201I)*

Bulk Feeders

Refers to line of rotary valves and power driven feeders located below bulk bins for handling powdered or granular materials. Bulletin F-5, 7p.—*Fuller Co., Catasaqua, Pa. (201J)*

Die-Stamped Heat Exchanger

Concerns advantages of a new die-stamped heat exchanger plate, formed by welding two sections together. It is said to have high heat transfer efficiency and low weight.—*Tranter Mfg. Co., Lansing, Mich. (201K)*

Silica Activator

Operation and lay-out discussed for a continuous silica activator and feeder, used in water and sewage treatment. Bulletin 63-M1, 4 p.—*Omega Machine Co., Providence. (201L)*

Insulation Handbook

Comprehensive booklet gives types of finishes, applications, and installation instructions for Foamglas insulations. Form FL-100, 24 p.—*Pittsburgh Corning Corp., Pittsburgh. (201M)*

Wall Doors For Conveyors

Illustrates line of doors for sealing conveyor openings through walls. Said to cut fly and rodent entry. Units are equipped with inside locks. Bulletin D 101, 6 p. —*Conveyor Specialties Co., St. Paul, Minn. (201N)*

Tile Flooring

Color catalog relates advantages of quarry tile flooring for appearance and non-skid qualities. Form 159, 8 p.—*Carlyle Tile Co., Ironton, Ohio. (201O)*

Water Softeners

Concerns line of water softeners with a capacity range from 38,000 to 400,000 gr., for use where small quantities of soft water are required in processing. Bulletin 210, 4 p.—*Industrial Filter & Pump Co., Chicago (201P)*

Ice Builder

Details how refrigeration loads in ice water system can be evened out by use of an air-agitated ice builder that stores cooling capacity. 8 p.—*Tom Lockerbie, Inc., Utica, N. Y. (201Q)*

Foreign Particle Detector

Provides specifications and installation examples for an electronic tramp metal detector that spots both ferrous and non-ferrous metals. Bulletin 15B7217B, 4 p.—*Allis-Chalmers Mfg. Co., Milwaukee. (201R)*

Corrosion Control

Offers laboratory service for the detection and control of boiler water corrosion problems. 4 p.—*Hall Laboratories, Inc., Pittsburgh. (201S)*

Cooling Tower Pumps

Manual details 6-step system for sizing cooling tower pumps and piping. Bulletin GR-155, 8 p.—*Bell & Gossett Co., Morton Grove, Ill. (201T)*

Packaged Boiler

Covers hot water boiler with capacity of 900 gph. Unit is vertical, compact, and is of the direct-steam-mixing type. Bulletin 920, 4 p.—*Fred H. Schaub Engineering Co., Chicago. (201U)*

Diesel Engine

Full description, specifications, and photos, relate features of two diesel engines, with capacities from 375 to 1,000 hp. Form 10,040, 20 p.—*Ingersoll-Rand, New York City. (201V)*

Centrifugal Air Washers

Outline uses of centrifugal air washers for the recovery of dust and fines. Bulletin W-555, 4 p.—*Ducon Co., Mineola, N. Y. (201W)*

Centrifugal Pumps

Catalog lists two series of centrifugal pumps, with prices, that are suitable for cooling tower use. CSP-155, 8 p.—*Bell & Gossett Co., Morton Grove, Ill. (201X)*

Magnetic Metal Separator

Gives dimensions, features, and installation examples for a rotary-drum, magnetic, tramp metal separator. Catalog C-1100-A, 10 p. —*Dings Magnetic Separator Co., Milwaukee. (201Y)*

Refrigeration Valves

Describes and gives selection data for a line of refrigeration valves. Catalog includes expansion valves, pressure regulators, filters, and driers. Form W-3-S, 20 p.—*A-P Controls Corp., Milwaukee. (201Z)*

Vacuum Processing Pump

Details of a series of vacuum booster pumps, ranging from 4 to 16 in., for low-pressure processing operations. Give high capacity in the 10 to 500 micron range. 4 p. —*F. J. Stokes Machine Co., Philadelphia. (201AA)*

Bi-Metal Tubes

Concerns use of tubes, lined with a different metal, for use in heat exchangers where two corrosion problems exist outside and inside the tube at the same time. Examples are given and data listed. Bulletin 1954, 16 p.—*Bridgeport Brass Co., Bridgeport, Conn. (201AB)*

Lubricated Plug Valve

Detailed bulletin specifies features, lists types and sizes of lubricated plug-type valve line. Unique design is said to prevent sticking and promote easy operation. Reference Book 39, 28 p.—*Homestead Valve Mfg. Co., Coraopolis, Pa. (201AC)*

Special Conveyors

Illustrates a magnetic elevator, totally-enclosed tube conveyor, piano-hinge belt conveyor and elevator, and other custom made conveyor equipment. Contains diagrams and specification charts. Catalog 400, 40 p.—*Prab Conveyors, Inc., St. Clair Shores, Mich. (201AD)*

Cartridge Heating Unit

Considers advantages and construction features of an enclosed electric heating cartridge ranging in length from 1¼ to 12 in. 4 p.—*Watlow Electric Mfg. Co., St. Louis. (201AE)*

In-Line Mixer

A compact unit that installs in a pipe-line is said to eliminate need for mixing tanks. Photos, diagrams, and tables tell the story. Bulletin 300, 4 p.—*American Well Works, Aurora, Ill. (201AF)*

Cyclone Separator

Bulletin introduces new-model cyclone separator developed for wet processing in the 10 to 20 micron range. It consists of a series of 30 or 50 mm. individual, molded rubber-block units in a single bronze or stainless steel housing. Bulletin 2504, 6 p.—*Dorr-Oliver, Inc., Stamford, Conn. (201AG)*

Electric Vibrators

Concerns specifications, prices, and installation facts for a line of electric vibrators. Units are used on bins, hopper cars, and other places where materials tend to plug or stick. Catalog 11, 10 p.—*Cleveland Vibrator Co., Cleveland. (201AH)*

Variable Pitch Sheaves

Comprises tables of sizes and dimensions for two series of variable pitch motor sheaves. One line is designed for stopped-motor adjustment, the other for running changes in speed. Bulletin 20B6082C, 4 p.—*Allis-Chalmers Mfg. Co., Milwaukee. (201AI)*

Fuel Shut-Off Valves

Considers advantages, installation, and maintenance of a series of automatic fuel shut-off valves.

They are said to safeguard boiler in event of flame, fan, or pump failures, and loss of electric power. Units must be reset by hand. Bulletin CV-31, 4 p.—*Electronics Corp. of America, Boston. (201AJ)*

Magnetic Motor Brakes

Cut-away drawings and diagrams illustrate specifications for line of magnetic disk brakes used on motor drives. Available with torque ratings from 1½ to 175 lb. ft. for motors from ½ to 50 hp. Bulletin BK4002, 8 p.—*Dings Brakes Inc., Milwaukee. (202A)*

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Evaporator Condenser Line

Full specifications on evaporative condenser capacities. Units are available in sizes from 5 to 100 tons, and are constructed in three sections for versatile inlet-outlet locations and piping arrangement. 4 p.—*Industrial Mfg. & Engineering Co., Chicago. (202B)*

Fire and Freeze Alarm

Details on fire detection unit with three contacts: First, closes at 135 F. and warns local personnel; second, at 155 F. can be wired to a central control. The third contact, set at 35 deg. F., can be used to prevent freeze damage to goods or produce. Form D-100, 4 p.—*Bruhn Detect-O-Stat Co., Inc., Racine, Wis. (202C)*

Centrifugal Pumps

Cut-away drawing shows centrifugal pump construction features. Tables list performance specifications for the line. Bulletin 350, 6 p.—*American-Marsh Pumps, Battle Creek, Mich. (202D)*

Glass Fiber Pipe Insulation

Concerns glass fiber pipe insulation with aluminum foil vapor barrier, covered by a bleached paper layer. Installation is said to cut condensation on cold product lines and provide an attractive appearance. 4 p.—*Owens-Corning Fiberglass Corp., Toledo. (202E)*

Air Line Lubrication

Concerns a method of air line lubrication wherein oil is converted to a mist. System is said to be economical, efficient, and easy to maintain. 4 p.—*Gits Bros. Mfg. Co., Chicago. (202F)*

Speed Changer

Considers a totally enclosed speed changer that features variable pitch pulleys. Unit is compact and ranges in size from 1 to 75 hp. Bulletin 20B6013D, 6 p.—*Allis-Chalmers Mfg. Co., Milwaukee. (202G)*

Steam Jet Applications

Discusses wide range of applications for steam jet apparatus. Among uses listed are: Syphoning, evacuating, heating, exhausting, compressing, scrubbing, and condensing. Background material on jet construction also included. Bulletin J-1, 10 p.—*Schutte & Koerting Co., Cornwells Heights, Pa. (202H)*

Warm Air Heaters

Discusses a line of direct-fired warm air heaters. Gives installation examples and construction features. Catalog GC-4-55, 8 p.—*Prat-Daniel Corp., South Norwalk, Conn. (202I)*

Hydraulic Transmission

Details of new hydraulic transmission unit for electric motor drives. It features infinite variable speed to 1500 rpm, constant or variable torque and horsepower, and hand or remote-automatic control. Catalog Section T-100, 4 p.—*Gerotor May Corp., Baltimore. (202J)*

Magnetic Transmissions

Refers to selection data, torque requirements, and service factors for a line of magnetic brakes and clutches. Bulletin 226D, 8 p.—*Stearns Magnetic, Inc., Milwaukee. (202K)*

Packaged Boilers

Illustrates theory behind packaged boiler operation, and indicates how plant men can survey their steam needs. Also, gives installation case histories. 12 p.—*National-U. S. Radiator Corp., Oswego, N. Y. (202L)*

Speed Reducers

Contains engineering data and illustrations for a wide line of compact gear reducers, rated from fractional to 150 hp. Manual LP 3, 40 p.—*Foote Bros. Gear and Machine Corp., Chicago. (202M)*

Butterfly Valves

Advantages given for use of rubber-seated butterfly valves. Units said to be low in weight, economical, and space saving. Available with manual, electric, hydraulic, and air operated closing devices. Bulletin 650-L1A, 4 p.—*Builders-Providence, Inc., Providence. (202N)*

Steam Traps

Comprehensive catalog give engineering data, operation, and capacities for a wide line of industrial steam traps. Catalog 953, 29 p.—*W. H. Nickolson & Co., Wilkes-Barre, Pa. (202O)*

MAINTENANCE

Masonry Waterproofing

Advantages and application instructions listed for a 2-coat, interior and exterior masonry coating, said to waterproof walls.—*Upco Co., Cleveland. (202P)*

Hose & Fittings

Four leaflets give specifications and diagrams of hose-fittings and 3-ply synthetic rubber and rayon hose, used for fuel and low-pressure air transfer. File 4484A(10-12) and 4480A10.—*Parker Appliance Co., Cleveland. (202Q)*

Floor Waxing

Informs on a hard-coat floor wax, said to be easily removed for re-waxing with a special stripping compound. Wax features non-skid surface with bright finish. 4 p.—*Johnson & Son, Inc., Racine, Wis. (202R)*

Washroom Maintenance

Chart lists 16 points for daily and weekly checking to up washroom maintenance efficiency. Sanitation products listed with each point. 4 p.—*Huntington Laboratories, Huntington, Ind. (202S)*

Rubber Sheet Packing

Lists specifications for a line of cloth-finished sheet packing, and for rubber, diaphragm, and oil-resistant type sheetings. 4 p.—*Boston Woven Hose & Rubber Co., Boston. (202T)*

Piston Rings

Full details for a line of wrought alloy piston and sealing rings. Technical data given for the 8 alloys used. 8 p.—*Precision Piston Rings, Inc., Indianapolis, Ind. (202U)*

Floor Maintenance

Comprehensive booklet charts way to floor maintenance efficiency. Report forms and floor diagrams included as aids to program. *Planning An Efficient Floor Maintenance Program*, 20 p.—*National Sanitary Supply Assoc., Chicago. (202V)*

Floor Cleaning Machine

Concerns advantages of using a suction machine to clean large floor areas. Said to suck dust and dirt from up to 20,000 sq. ft. of surface/hr. Bulletin 551, 4 p.—*—Handling Devices Co., Inc., Brookline, Mass. (202W)*

Oils & Solvents

Bulletin gives technical data on 35 different white oils, petrolatums, and odorless solvents. Bulletin 555, 4 p.—*Pennsylvania Refining Co., Butler, Pa. (202X)*

Expansion Joints

Gives full details on a packless, diaphragm-type expansion joint, available in sizes from ½ to 72 in., and designed for pressures from a vacuum to 1,000 psi. Can be used for steam, oil, gas, and chemical lines. Catalog EZ-55, 12 p.—*T. R. Finn & Co., Inc., Hawthorne, N. J. (202Y)*

Self-Flaring Fitting

Diagrams show operation of a self-flaring, combination tube fitting, said to cut installation time and give a tight seal. Comes in standard sizes for ¼ to 2 in. o.d. tubing. Catalog BA 555, 4 p.—*Flodar Corp., Cleveland. (202Z)*

Power Flaring Tool

Treats of 110v. motor-driven flaring tool for use on annealed seamless copper, aluminum, steel, and stainless tubings. Interchangeable heads and attachments fit unit for deburring, squaring, and beading operations. Catalog File 1145-A12, 8 p.—*Parker Appliance Co., Cleveland. (202AA)*

Packings & Gaskets

Three bulletins detail line of packings, gaskets, special parts, and stock material fabricated with Teflon. Covers ring, impregnated asbestos, and V-type packings; jacketed, solid ring, and expansion joint gaskets. Bulletins CP 552, CP553, CP554.—*Chemical & Power Products, Inc., New York City. (202AB)*

MATERIALS HANDLING

Light-Weight Trucks

Leaflets picture and give specifications for a line of light-weight magnesium bin, stock, platform, and shelf trucks, mounted on caster wheels.—*Brooks & Perkins, Inc., Detroit. (202AC)*

Preformed Steel Racks

Brochure illustrates construction of various space-saving racks from prefabricated steel channels. Angles and braces are pre-formed, and unit is said to need no drilling, welding, or special tools for assembly. 4 p.—*Elcen Metal Products Co., Franklin Park, Ill. (202AD)*

Handling Savings

Four field reports on flour, produce, sugar, and cheese plants give facts and figures on money and time saving advantages of a properly installed conveyor system. Field Reports 14, 15, 31, and 36, 12 p. total.—*Rapids-Standard Co., Inc., Grand Rapids, Mich. (202AE)*

Conveyor Line

Pictures typical installations and provides general information on line of spiral chute, belt, and roller conveyors. Catalog 309, 25 p.—*Standard Conveyor Co., North St. Paul, Minn. (202AF)*

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Low-Lift Platform Truck

Pictures depict new features of a 6-in.-lift platform truck. Has 2 speeds forward, 2 reverse. Band-brakes give quick control. Unit is powered by battery. Bulletin 551-1, 4 p.—*Barrett-Cravens Co., Northbrook, Ill. (205A)*

Compact Stacker

Considers advantages of a compact, 4,000-lb.-capacity electric stacker for use in narrow aisles. Bulletin ESS-40, 4 p.—*Automatic Transportation Co., Chicago. (205B)*

Scoop-Dump Bucket

Shows operation of a hydraulic scoop-and-dump bucket, for mounting on fork trucks. Unit said to be easily interchangeable with forks. 2 p.—*Lewis-Shepard Products, Inc., Watertown, Mass. (205C)*

Wire Fork Truck Baskets

Full details on unique wire baskets, available in 2,000 to 4,000 lb. capacities. Units are mounted on rigid base for fork truck handling and stacking. Form MHP-104, 8 p.—*Union Steel Products Co., Albion, Mich. (205D)*

Two-Wheel Hand Truck

Relates data and uses of a ½-ton-capacity two-wheel hand truck, ruggedly constructed of tubular steel. Model RL-10, 2 p.—*U. S. Products, Inc., Columbus, Ind. (205E)*

Straddle-Dump Truck

Concerns 20,000-lb.-capacity truck that carries bin under body. Hydraulic arms lift for dumping action. It is said to be highly maneuverable. Series 81, 4 p.—*Clark Equipment Co., Benton Harbor, Mich. (205F)*

Vibrating Conveyor

Line drawings and photos give facts on vibrating conveyor for movement of powder, flake, and granulated products. 4 p.—*Gifford-Wood Co., Hudson, N. Y. (205G)*

Pneumatic Conveying

Possibilities and advantages of air conveying are set forth by use of examples from different industries. 12 p.—*Metals Disintegrating Co., Inc., Summit, N. J. (205H)*

PROCESSING

Vibrating Separator

Covers features of adjustable vibrating separator for screening solids, available in single or multi-deck units. Screens made in coarse to 325 mesh sizes.—*Southwestern Engineering Co., Los Angeles. (205I)*

Liquid Filler

Details on liquid and semi-liquid piston filler, said to handle cans up to 800 per min. 4p.—*W. F. & John Barnes Co., Rockford, Ill. (205J)*

Fat & Oil Purifier

Relates experiments using new material to simplify purification of fats and oils. Chemical said to accelerate hydrogenation, remove trace metals, give a lighter initial color, and improve impurity removal. Bulletin 501, 8p.—*West Virginia Pulp & Paper Co., Charleston, S. C. (205K)*

Continuous Cooking

Illustrates principles behind use of continuous cooker-cooler for high product quality. *The Sterilmatic Story*, 18 p.—*FMC Corp., Canning Mach. Div., Hoopeston, Ill. (205L)*

Fast Mixer

Diagrams show features of a unique centrifugal mixer, said to give fast dispersion without product swirl. Bulletin RKM-10, 4 p.—*Neumann & Weaver, Inc., Fair Lawn, N. J. (205M)*

Complete Frying Line

Specifications given for equipment line which batters, breads, fries, and cools in a straight line operation. Suitable for wide line of bread-and-fry products. 4 p.—*J. W. Greer Co., Wilmington, Mass. (205N)*

Animal Casing Processor

Catalog lists line of equipment for preparation of intestines used as meat product casings. Units minimize labor, speed operation. Catalog 67-A, 24 p.—*Allbright-Nell Co., Chicago. (205O)*

Electron Beam Generator

Relates plan for investigation of electron beam food processing. Generator can be bought or rented, and company aids in initial research. Pub 8A-3555, 6 p.—*General Electric Co., X-Ray Dept., Milwaukee. (205P)*

Continuous Dehydrator

Specifications and operational data discussed for new continuous vacuum dehydrator, used in liquid-to-powder concentration (FE Mar., p. 71). Bulletin 55-126, 6 p.—*Chain Belt Co., Milwaukee, Wis. (205Q)*

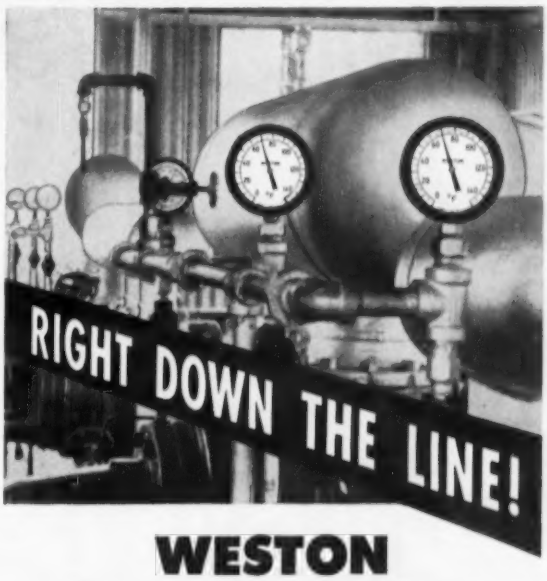
Wax Coater

Illustrates operation of a coating unit for sealing meats, cheese and other products by dipping them in liquid wax. Gives general specifications. Bulletin 55-5, 2 p.—*J. W. Greer Co., Wilmington, Mass. (205R)*

Automatic Filter Presses

Line of hydraulic filter presses in varying capacities, that separate, squeeze the cake, and eject it to conveyors automatically. Bulletin CC-55, 6 p.—*Fred S. Carver, Inc., Summit, N. J. (205S)*

DEPENDABILITY



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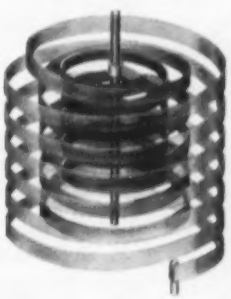

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Lard Filler

Details of straight line, two-spout lard filler that will fill 15,000 lb./hr. (maximum) into cans, cartons, jars, and pails. Machine adjustable from ½ lb. to 6.6 lb. Other semi-automatic machines also described. Catalog 65, 8 p.—*All-bright-Nell Co., Chicago. (206A)*

Screen Separation

Concerns compact unit that combines centrifugal and gravity force to seperate wet and dry materials. Machine can be also used for dewatering, removing dust, cleaning, and washing. Bulletin 243, 8 p.—*Nordberg Mfg. Co., Milwaukee. (206B)*

PACKAGING

Packaging Catalog

New condensed catalog lists line of packaging equipment which includes gluers and sealers, bottle and can packers, labelers, unscramblers, imprinters, and rinsers. 20p.—*Emhart Mfg. Co., Standard Knapp Div., Portland, Conn. (206C)*

Steel Containers

New directory lists Institute members alphabetically, and charts show products they make. Separate section considers steel container specifications and linings. 31 p.—*Steel Shipping Container Institute, Inc., New York City. (206D)*

Portable Bag Closer

Illustrated description of portable unit said to close 100 lb. textile and paper bags in less than 6 sec. 4 p.—*Dave Fischbein Co., Minneapolis. (206E)*

Paper & Textile Bags

Concerns wide line of paper and textile bags, ranging from open-mesh cloth to multi-wall kraft containers. 14 p.—*Chase Bag Co., Chicago. (206F)*

Heat Sealing

Considers advantages of a turret model heat sealer for plastic packaging. Electrodes can also be obtained in molded shapes for special containers. 4 p.—*Cargo Packers Special Products Co., Brooklyn, N. Y. (206G)*

Packaging Line

Pictures and explains series of units which will plastic-wrap powders, flat products, tablets, stacked items, and hopper fed objects. 4 p.—*Wrap-ade Machine Co., Inc., Belleville, N. J. (206H)*

Shipping Containers

Background information on the manufacture, testing, and uses of corrugated shipping boxes. 10 p.—*Hoerner Boxes, Inc., Keokuk, Iowa. (206I)*

Roll-Stock Packager

Line of packaging equipment handles a variety of different shaped products. Use of plastic roll-stock to eliminate need for large bag stocks discussed. 4 p.—*Pak-Rapid, Inc., Philadelphia. (206J)*

Bagging Scale

Line drawings and photos illustrate specifications for an automatic bagging scale, available in 5-25 and 25-50 lb. models. Various accessories also detailed. Bulletin 3749A, 6 p.—*Richardson Scale Co., Clifton, N. J. (206K)*

Automatic Tape Dispenser

Relates features of an electric tape dispenser. Unit operates by pushing keys, and will dispense lengths from 3-100 in. in widths from 1-4 in. Stainless steel construction cuts internal corrosion. 4 p.—*Ideal Stencil Machine Co., Belleville, Ill. (206L)*

Box Stitchers

Informs on line of fiber box stitchers, featuring an automatic in-line model that eliminates operator-fatigue. Three other manual models listed. 6 p.—*Inland Wire Products Co., Chicago. (206M)*

Foil Heat-Seal Labels

Technical manual details features and properties of thermoplastic foil label stock. 15 p.—*Cochran Foil Co., Laminating Div., Louisville, Ky. (206N)*

QUALITY CONTROL

Hand Refractometer

Describes features of a new hand refractometer, with a range from 0 to 30% sucrose. Unit has a carrying case, built-in illumination, and automatic temperature compensation. 2 p.—*American Optical Co., Buffalo. (206O)*

Fast Spectrophotometer

Concerns new combination optical spectrophotometer and cathode tube indicator that produces instantaneous curves in 400 to 700 millimicron range. Wavelength and percent transmission appear linearly on an illuminated divided grid. 8 p.—*American Optical Co., Buffalo. (206P)*

Constant Heat Baths

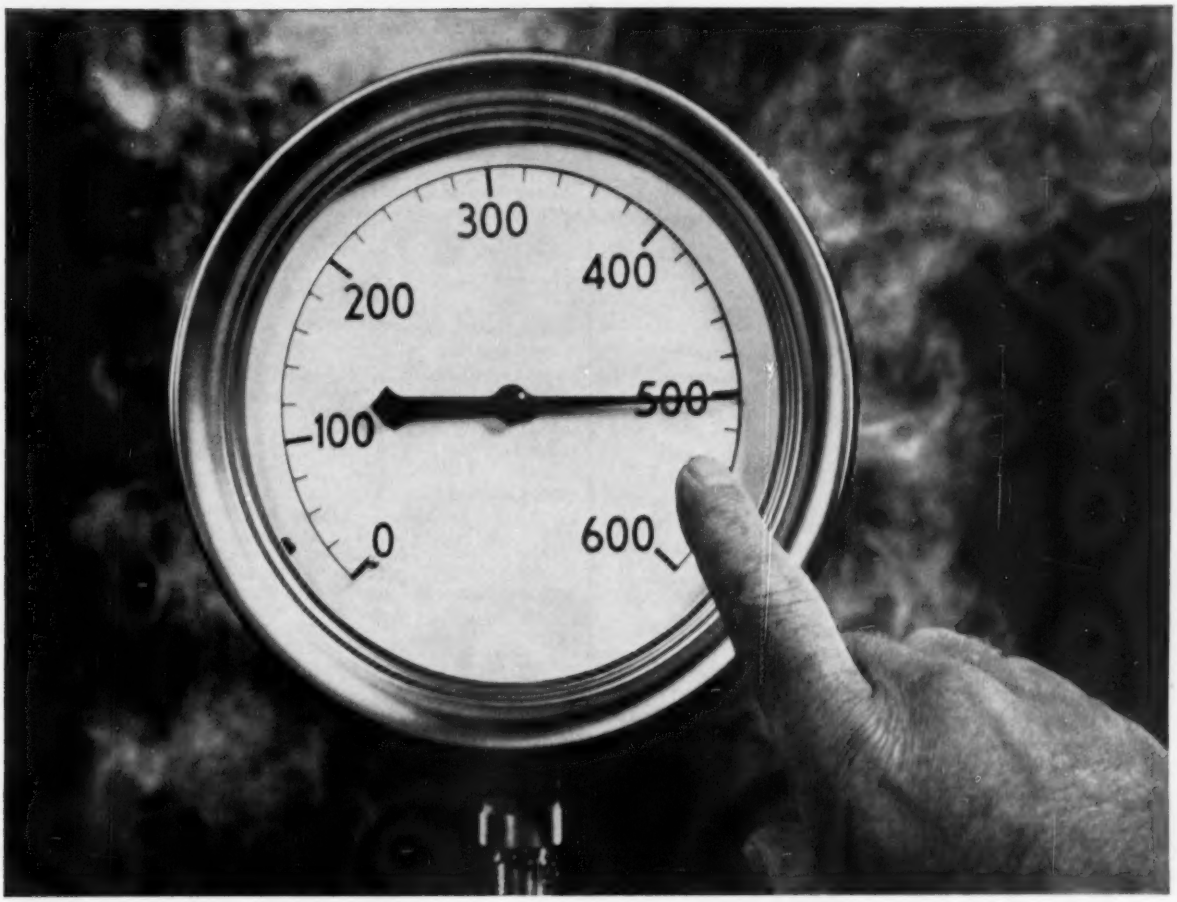
Gives specifications and photos of constant temperature baths with built-in agitation. Construction is stainless steel. 4 p.—*Blue M Electric Co., Blue Island, Ill. (206Q)*

Moisture Measurement

Describes equipment for high speed measurement of moisture content. Unit works on infra-red radiation, and is simple to operate. 4 p.—*Central Scientific Co., Chicago. (206R)*

Compact Colorimeter

Treats of new, compact colorimeter with direct reading scale



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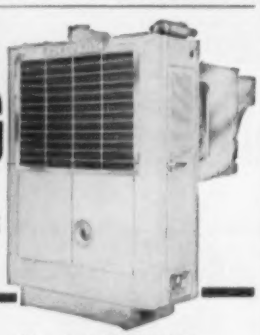

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for percent transmittance and optical density. Methods manual, included with unit, pinpoints 42 tests. 6 p.—*Bausch & Lomb Optical Co., Rochester, N. Y. (206S)*

Selective Filtering

Details method of separating bacteria and colloidal particles from solution by means of porous membranes. Additional information on culture broths and auxiliary equipment. 35 p.—*Millipore Filter Corp., Watertown, Mass. (208A)*

Temperature Measurement

Illustrates potentiometer and other equipment necessary to conduct precise laboratory temperature measurements. Also used to calibrate instruments. 4 p.—*Leeds & Northrup Co., Philadelphia. (208B)*

SANITATION

Alkali Safety Chart

Two-color wall chart gives 37 specific hints on safe handling of solid, liquid, and flake caustic soda. Also, lists first aid measures. —*Diamond Alkali Co., Cleveland. (208C)*

Odor Control

Chemical acts to mask odors and prevent growth of odor-producing micro-organisms. Can also be used as a solvent cleaner. 6 p.—*Allied Chemical & Dye Corp., Solvay Process Div., New York City. (208D)*

3-Way Cleaner

Leaflet indicates methods and applications of a chlorinated detergent which cleans, kills bacteria, and de-odorizes in one operation. 2 p.—*Oakite Products, Inc., New York City. (208E)*

Versatile Cleaner

Leaflet describes uses for a cleaner said to be efficient in heavy-duty floor cleaning and wall, woodwork, window, and truck washing. Also, strips floor wax.—*Brulin & Co., Inc., Indianapolis. (208F)*

Vacuum Fumigation

Relates methods and chamber-type equipment used in vacuum fumigation for insect infestation control. Test results and specifications given.—*John Mohr & Sons, Chicago. (208G)*

Drum Cleaner

Illustrated description of airless, abrasive method for cleaning outside of closed-end drums, and both inside and outside of open-end containers. Bulletin 113-D.—*American Wheelabrator & Equip. Corp., Mishawaka, Ind. (208H)*

MANAGEMENT

Safety Signs

Color illustrations show stock line of metal safety signs and tags, many available in foreign languages, for use in reducing accidents and hazards. 48 p.—*Ready Made Sign Co., New York City. (208I)*

Research Service

Illustrated brochure indicates services available from research and development laboratory. 28 p. —*Truesdail Laboratories, Inc., Los Angeles. (208J)*

Hearing Tests

Booklet concerns program for pre-employment hearing tests to establish applicant's qualifications and guard against future claims. Considers techniques and proper recording of data. *Guide For Industrial Audiometric Technicians,* 36 p.—*Employers Mutuals of Wausau, Wausau, Wis. (208K)*

Laboratory Financing

Release describes new financing plan for purchase of lab equipment, supplies, and furniture. 3p. —*Chicago Apparatus Co., Chicago. (208L)*

Visual Scheduling

Aluminum wall panel details shown in numerous illustrations. Board has stamped grooves for holding cards, which come in six colors. Can be used for scheduling production, sales, shipping, etc. 23p.—*Graphic Systems, New York City. (208M)*

INGREDIENTS

Dough Emulsifier

Facts on use of high monoglyceride-type emulsifier for dough products. Available in 350 lb. drums and 35 lb. pails. 12 p.—*R. T. Vanderbilt Co., Inc., New York City. (208N)*

Concentrates Catalog

Summer catalog lists and prices wide line of essential oils and concentrates of interest to food processors. 25 p.—*Magnus, Mabee & Reynard, Inc., New York City. (208O)*

Brine Making

Booklet details Lixate process of brine making. Contains flow sheet for food industry installations. *Brine For Today's Industry,* 33 p. —*International Salt Co., Inc., Scranton, Pa. (208P)*

Flavor Prices

Lists line of concentrates, essential oils, colors, and flavors with prices. July Catalog, 12 p.—*Fritzsche Brothers, Inc., New York City. (208Q)*

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If you use pure vanilla concentrates for FLAVOR, not just for chemical analysis, WHOL-BEAN PURE VANILLAS may save half your cost. Solely vanilla beans, direct extracted—no distillation—no monkey business. Just more flavor. Write today.
FLAVOR SERVICE CO.
297 E. Erie St. — Milwaukee 2, Wis.

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO., INC.
PHILADELPHIA, PA.
3 WAREHOUSE LOCATIONS
Proper Temperature for Frozen Foods

CARROT OIL makes food golden yellow

Carrot oil, like butter, contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.
Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil and because it contributes vitamin A of high stability and desirable golden yellow color. Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

SEND FOR BOOKLET
New 36-page combined catalog on carrot oil for foods, feeds, and pharmaceuticals. Important reading for most food processors. Write today!
NUTRITIONAL RESEARCH ASSOCIATES
205 Broad St., South Whitley, Ind.

EMPLOYMENT OPPORTUNITIES

The Advertisements in this section include all employment opportunities—executive, management, technical, selling, office, skilled, manual, etc.

Positions Vacant
Positions Wanted
Part Time Work
Civil Service Opportunities
Selling Opportunities Wanted
Selling Opportunities Offered
Employment Agencies
Employment Services
Labor Bureaus

DISPLAYED ——RATES—— **UNDISPLAYED**

The advertising rate is $18.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

An advertising inch is measured ⅞" vertically on a column—3 columns—30 inches to a page.

Subject to Agency Commission.

$1.50 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Box Numbers—counts as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Not subject to Agency Commission.

Send NEW ADS to FOOD ENGINEERING, 330 W. 42nd St., N. Y. 36, N. Y. for September issue closing August 24th

FOOD OR DAIRY ENGINEER

International organization assisting under-developed countries improve local diets seeks experienced engineers who know food or milk treatment equipment and processes, and have ability, initiative and tact, augmenting present small staff international engineers.

Engineers must have the ability to deal and negotiate with top government officials as well as all levels of technical workers. Engineering work is of non-commercial nature, but knowledge of commercial practices is desirable.

Positions are located at New York and Paris and involve international travel. Good salaries and liberal side benefits. Present unique opportunity in field of constructive international co-operatoin.

Write giving age, education, experience and salary requirements.

P-7190, Food Engineering
330 W. 42 St., New York 36, N. Y.

PRODUCT DEVELOPMENT

Opportunity for food technologist to work in product development field for national food manufacturer in Chicago. Should have 5 to 10 years experience in food product development with emphasis on frozen foods. Should be between 30 and 45, in good health. Must have imagination, ability to work well with others and a successful record in the field of product development. Replies will be held in confidence. Send resume with recent snapshot to

P-6889, Food Engineering

520 N. Michigan Ave., Chicago 11, Ill.

FOOD TECHNOLOGIST

Fast growing frozen food processor and manufacturer located in middle west has opening for experienced food technologist. This position offers unusual opportunity to right person with these qualifications:

1. **Bachelor's Degree in Food Chemistry or Technology**
2. **Minimum 5 years experience in food field**
3. **Adept in all phases product development and quality control**
4. **Willing to relocate**

Salary is open for discussion. Replies will be held in strict confidence and should include in reasonable detail educational background, experience, age and present salary.

P-7252, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

ENGINEERS WANTED

Large established meat packing corporation require services of engineers both Chemical and Industrial, for supervisory and/or development work in Argentina and Brasil. Good opportunity for right men, necessary to have degree or equivalent plus experience. Age limit under 40.

P-6969, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

PLANT LAYOUT ENGINEER

Large Wisconsin food processor. Will work with production departments and industrial engineers on layout matters. Degree essential. Desire man in early stages of engineering career with good advancement potential.

P-7141, Food Engineering
520 N. Michigan Avenue, Chicago 11, Illinois

WE NEED

FOOD TECHNOLOGISTS and FOOD CANNING CANDIDATES
—junior to top-level

Call, write or wire:
Gladys Hunting (Consultant)
Drake Personnel, Inc.
220 S. State St., Chicago 4, Ill.
HArrison 7-8600

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)
LOS ANGELES: 1111 Wilshire Blvd. (17)

POSITIONS VACANT

Sanitarians—for local health units. Salary range $332-384. Contact: Merit System Council, 429 State Office Building, Phoenix, Arizona.

Opening for man to work on quality control in large cannery. Grading experience of canned goods such as snap beans, asparagus, tomato products, pork & beans, etc. according to government grades, would be helpful. Some basic knowledge of Chemistry desirable. Advise experience and salary wanted to P-7077, Food Engineering.

Food Chemist, experienced in fountain toppings and ice cream flavorings to take charge of laboratory, quality control and new product development in old established company. Please supply full details, training and experience. P-6997, Food Engineering.

Food Plant Inspector opening in our sanitation division. Must be U. S. Food and Drug trained and be qualified to handle sanitation problems in all types of food plants. Prefer married man. Location East Coast. Excellent opportunity to grow with prosperous company engaged in this line for several years. Metropolitan travel. Salary arrangements excellent. Reply P-7200, Food Engineering.

Position open as Research Chemist with prominent specialty corn mill. Applicant should be a cereal chemist with experience in product development and production. Opportunity for advancement to executive position. Age preferably 35-40. Reply giving full resume with snapshot. State salary expected, address, box number. P-7272, Food Engineering.

POSITIONS WANTED

Plant or Production Mgr. food processing or allied industries. Experienced production engineering, purchasing, some sales. Grad engineer. Excellent health. PW-6598, Food Engineering.

Customer Service and/or Technical Sales Director chemist and food technologist of reorganized stature in the food industry, with outstanding record of achievement in the field of technical service and sales, seeks opportunity to organize and/or direct a department to serve the food industry. Although most specifically trained in the field of edible fats and oils, experience is sufficiently broad to do outstanding job with practically any types of food products or materials. PW-7133, Food Engineering.

Food Engineer—B.S. in Ch.E., completing Ph.D. in Food Tech. in Fall 1955. Two years teaching in Ch.E., including food engineering courses. One year industrial experience with s.s. evaporator and spray dryer mfr. 31, family. Desires opportunity to apply sound engineering in food processing field through engineering research, process improvement and development, engineering management. PW-7257, Food Engineering.

FOOD TECHNOLOGIST

With degree from recognized university for development work in the Research Laboratory of a large food manufacturing concern. Must have intimate knowledge of soup development and production. In reply, state education, research and development experience, previous employment history, age and salary expected.

P-7132, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOREMAN

Position open with food manufacturer for a man to control Preserve, Jam and Jelly Department. Individual must have had several years experience with vacuum pan processing. Reply stating age, experience and salary desired and when available.

P-7161, Food Engineering
330 W. 42 St., New York 36, N. Y.

STAFF MANAGER STANDARDS

Major processor has general staff position available for man experienced in establishing standards and controlling yields in processing operations. As staff head will have administrative responsibilities for formulation of policy and operations in each of the Company's plants. Minimum 7 years experience in this field. Salary in area of $10,000, however dependent upon individual's qualifications. Send complete resume to

P-7228, Food Engineering
330 W. 42 St., New York 36, N. Y.

POSITIONS WANTED

Project Engineer—M.E., age 29, 5 years of manufacturing and administrative experience in food industry equipment supplier. Desires project engineering position in food plant or related equipment supplier. Willing to relocate in Northeastern United States. Address PW-7267, Food Engineering.

Food Technologists-Executive. B.S., M.I.T. 12 yrs. varied responsible experience in quality control, new product development, administration, advertising, packaging, and merchandising. Seeks greater opportunity than at present. PW-6696, Food Engineering.

Production Man—exceptional, capable technologist and plant supervisor with extensive manufacturing experience frozen foods and related specialty fields desires suitable connection. Good right hand man for top executive. Will relocate. PW-6909, Food Engineering.

Your inquiry will have Special Value . . .

If you mention this magazine, when writing advertisers. Naturally, the publisher will appreciate it . . . but, more important, it will identify you as one of the men the advertiser wants to reach with this message . . . and help to make possible enlarged future service to you as a reader.

SEARCHLIGHT SECTION

(Classified Advertising)

BUSINESS OPPORTUNITIES — EQUIPMENT - USED or RESALE

AUCTION - AUGUST 18, 1955
CAKE-MIX AND FOOD PLANT

Model B Transwraps; S.&S. auto. Filler HG84; S.&S. semi-auto. Fillers; U. S. JK auto. Filler; Ceco Carton Sealers; *Standard-Knapp 429 Gluer & Sealer; Model D FitzMills;* Horiz. & Vert. Powder Mixers to 50 cu. ft.; Day RoBall & Great Western Sifters; *2500 lb. Fork Lift Elec. Truck; Elec. Platform Truck;* Skids & Pallets; Elec. Hoists; Conveyors; Industrial Vac. Cleaners; complete *Laboratory* Furniture, Glassware, Scales, Ovens, Refrigerators, etc.; complete *Maintenance Equipment; Office Equipment,* Adding Machines, Typewriters, Desks, Files, Air Conditioning Units, etc.

FOR INFORMATION 'PHONE OR WIRE—

John A. O'Grady Auctioneer
40 Bayview Avenue, Jersey City, N. J.
Delaware 3-6323

42 ONE-PIECE GLASS-LINED TANKS

One piece welded tanks with Glass linings by A. O. Smith, available for immediate delivery, can be purchased individually, complete description, option for inspection, and price upon application.

Quantity	Capacity Each	Dimensions
4	18,135 gallons	9' x 40' long
4	14,911 gallons	12' x 18' long
6	14,322 gallons	9' x 32' long
12	12,863 gallons	8' x 32' long
10	10,447 gallons	12' 6" x 19' 6" long
3	5,270 gallons	7' x 20' long
3	7,347 gallons	10' 6" x 12' high

May be purchased individually or in lots—50% of new. Inspection invited

FS-7218, Food Engineering
330 W. 42 St., New York 36, N. Y.

DAVENPORT GRAIN DRYER

Rotary steam tube dryer, 6' dia. by 35' long, 54-4" steam tubes, 125 p.s.i.; capacity 1000 bs. dry grain per hour, with 7½ HP drive, #3A press and drive, wet grain tank, conveyors, storage tanks, dewatering screens; complete installation, installed new 1950, may be inspected and shipped immediately at a real bargain.

FS-7275, Food Engineering
330 W. 42 St., New York 36, N. Y.

SWEETLAND FILTER

Can ship immediately, Sweetland #7 filter, complete details upon request, subject to prior sale, replaced with larger unit.

FS-7273, Food Engineering
330 W. 42 St., New York 36, N. Y.

WANTED
Carton Opening and Closing Equipment

For glued end 4 x 1½ x 6 cartons. Ceco or similar. We want to insert two 4 ounce prepackaged packets. Also need skate wheel conveyor 12 inches wide.

KNOX CRUTCHFIELD, Inc.
Port Republic, Virginia
Phone Goods Mill, Va. 29

BUSINESS OPPORTUNITY

Wanted: well rated food company desiring diversification of food products manufacturing by consulting food chemist 20 years experience with a successful food products manufacturing expansion plan of research and production. BO-6800, Food Engineering, 520 No. Michigan Ave., Chicago 11, Ill.

IN STOCK AT LOEB'S

Cappers: Capem, Titecap, Swanson, U. S. automatic and semi-automatic.
Centrifugals: Fletcher 12" copper, 17" stain. steel, 20" lithcoated, Tolhurst 26" copper.
Clarifiers: De Laval model 84-51.
Collectors, dust: bag 5" dia. x 2½' to 5' long, steel.
Condensers: stainless steel and copper.
Conveyor, port. Rapid Standard, 16' lg., 16" wd.
Conveyor Tables: belts from 5½" wide x 12' long and up.
Cutters, silent: Buffalo 32" and 43".
Dicer: Sterling model EMIC-1/N2.
Dryer: Devine 2 x 4' vac. drum, st. steel.
Dryers: vacuum shelf, Stokes 20 shelf, Devine 10 shelf.
Extractor: Troy 26" monel basket.
Feeders: Syntron F-22, 10 x 36" trough.
Fillers, liquid: Peerless 6 valve, Cass gross weight, siphon and vac. types.
Fillers, piston: Stokes, Colton, Elgin, Filler Machine Co. for jars, tubes.
Fillers, powder: Speedee, Triangle, Stokes & Smith, Ferguson.
Filter Presses: Sperry, Shriver 6"-36", recessed and plate and frames types.
Filters: int. pressure — Alsop, Sparkler, Lomax, Industrial, Sweetland.
Filter, vacuum: Oliver 2½x1', Denver 1x3'.
Fryolators: Pitman gas fired, 18" well.
Homogenizer: 400 GPH. st. steel, Manton-Gaulin.
Kettles: Stainless steel 5 to 150 gal., with and without agitators, aluminum 40 to 100 gal.
Labelers: Burt, Knapp, New Jersey, World, Ermold—auto. and semi-auto.
Mills, attrition: 30" 40 hp.
Colloid: Charlotte 3 hp., Premier 3 hp.
Hammer: Mikro 1SH, 2DH, 2TH, Gump #1, Prater, Raymond, Jay Bee, Jeffrey 30 x 24", Williams #2 and BX.
Mixers: Dough type single and double arm, 5 to 100 gal.
Powder: 50 to 2000 lb. capacity.
Portable Electric: ¼ to 5 hp.
Pan, vacuum: stain. steel 30 x 48".
Pasteurizer: Wallace-Walker plate type, 200 GPH., st. steel.
Peeler: Blakeslee model SN-27146.
Pumps: Centrifugal, rotary, gear, vacuum, all types and sizes.
Retorts: 42 x 72" and 24 x 30".
Screens: Rotex 20 x 48", 42 x 84".
Roball 40 x 120" stainless steel.
Selectro 4 x 10', Abbe Blutergess #1.
Sealers, carton: Standard-Knapp, Ceco, Triangle, Packomatic.
Sterilizers: Climax 20" x 36" jacketed.
Still, vacuum: 500 gal. stain. steel.
Tanks: Glass lined, various sizes.
Stain. steel 25 gal. to 1200 gal.
Viscolizer: 150 gal. Cherry-Burrell.

Dewatering Press: Davenport 3A, contact parts phosphor bronze, screen plates #20 Durimet, 5 hp. drive.

Send us your inquiries and list of idle equipment.

LOEB EQUIPMENT SUPPLY CO.

820 West Superior St. — **Chicago 22, Ill.**
Telephone: Seeley 8-1431 — **Our 31st Year**

WE HAVE IN STOCK
FOR IMMEDIATE DELIVERY
THE FOLLOWING TYPES OF EQUIPMENT

BOILERS
CANNING
CONFECTIONERY
DAIRY
FILLERS
MATERIAL HANDLING
STAINLESS STEEL JACKETED KETTLES
MEAT PACKING
MIXERS
MOTORS
PULVERIZERS
PUMPS
REFRIGERATION
SCALES
STAINLESS-STEEL TANKS
LARGE & SMALL STEEL TANKS

Consult Us for Your Food Processing Equipment
Send Us Your Inquiries
We Buy One Item or Entire Plants

AARON Equipment Company

1247 So. Ashland Ave., Chicago 8, Illinois
PHONE: CHesapeake 3-5300

AUTOMATIC COOLING UNIT—

Barry-Wehmiller "Vortex" automatic pasteurizer or cooling unit such as advertised in this publication, located in Brewery in Wilmington, Delaware, can be shipped in one piece, has capacity of approximately 218 bpm on 12-oz. experts, for pasteurization, overall dimensions are 42'6" long x 15'1" wide x 5'6" high, with motors, starting switches, etc., immediate delivery, subject to prior sale.

FS-7222, Food Engineering
330 W. 42 St., New York 36, N. Y.

September Specials

Groen SS 150 gal. Agtd. & Jktd. Kettle
Standard-Knapp Wrap-around Labelers
SS 24 cu.ft. Spiral Mixer, never used
Premier 8" SS Colloid Mill, 30 HP mtr.
Pneumatic Scale Labeler, serial 9894
MRM S/S 12 spout Rotary Vac. Filler
Phila. 2 piston S/S Filler, like new
Resina Capper, LC2, up to 80mm
Capem 5IF Capper, Caps up to 88mm.
250 gal. S/S steam jktd. Kettle, 90# press.
S/S Pasteurizer, 200 gal. Jktd. & Agtd.

NEW—STEEL & S/S MIXERS
KETTLES, TANKS & DRYERS
Fabricated to your Specifications
Engineering Advice Available

WE BUY COMPLETE PLANTS
OR SINGLE UNITS
What Have You For Sale?
YOU CAN BANK ON
EQUIPMENT CLEARING HOUSE, INC.
111 33rd Street, Brooklyn, N. Y.
SOuth 8-4451—4452—8782

FMC

TOP QUALITY EQUIPMENT AT LOW REBUILT PRICES

30 Years of Reliability
YOUR BEST GUARANTY

KETTLES

New and used Kettles in Stainless, Nickel, Aluminum, Copper, Steel, Glass Lined, Iron, in all wanted sizes Steam Jacketed or Unjacketed; some with agitators.

TANKS

In Stock at all times STAINLESS STEEL Vertical and Horizontal Tanks, with or without covers; with or without agitators; all sizes.

3413 Stainless 1500 Gal. Oval (milk truck type) Tank; 6'x6'x22" with 18" manhole and framework.
4168 Stainless 1300 Gal. Oval (milk truck type) Tank; 4'x6'x23" with 18" manhole and 4 cradles.
37621.10 Stainless 2120 Gal. Horizontal Tank 66" diameter x 116" long with dished heads and Stainless Agitator.
4059 E1 A. O. Smith Stainless Lined 20,000 Gal. Pressure Tanks; (125 PSI; 10'x36'; vertical or horizontal use.

VACUUM PANS, COOKERS, EVAPORATORS

3544 Pfaudler Glass Lined Closed Top Jacketed Vessel 4'x8'.
3824 S 14 Pfaudler Glass Lined Jacketed Kettle (manhole type) 3'x3'.
3994 K5 Monel Closed Top Jacketed and Agitated Vacuum Pan 5'x5'; paddle type agitator with 2 Hp. motor.
4093 M 59 Stainless Jacketed Agitated Cooker 5'x7' 7" with Evacter and Condenser.
9908 H 3 Aluminum Jacketed Vacuum Pan 250 Gal. 40" Diameter; manhole.
3662 D 1 Stainless Steel Pasteurizing Kettle 40"x29"
3113 K 2 Copper coil Heated Vacuum Vessel; 2000 Gal.; 7'x16' 7".

RETORTS

Always in stock, standard 3 Basket Retorts 40"x72" with baskets.
3259/64 Horizontal Retorts 66"x14' long with double track and door opening at each end; steam pipes full length.

All types of Dryers, Flakers, Rotary and Drum Types; Tray and Truck types either for Vacuum or Atmospheric pressure; Ovens, Crystallizers, Sterilizers, Humidifiers, Air Conditioners, etc.

Large stock of Agitators, Pumps, Conveyors, Hoppers, Heists, Instruments, Controls, Colloid Mills, Homogenizers, Viscolizers, Filters, etc.

MIXERS

Large stock on hand of New and Reconditioned Double Ribbon Mixers for powders, granulars, crystals, etc. from 200 lbs. to 5,000 lbs.

2109 J. H. Day Jacketed Double Ribbon Mixer 28"x26"x70"; 175 Gal.
1893 Readco Jacketed Double Ribbon Mixer; 30"x66"x51"; 218 Gal.
2986/M7 Sayers 200 lb. Marshmallow Beater 24"x24"x30".
3692/G9 J. H. Day Jacketed Egg Clipper Mixer; 20"x22"x28".
262/G7 J. H. Day Jacketed Egg Clipper Mixer; 32"x32"x32".
3951/U2 Henry Daty 200 Gal. Dough Mixer; 35"x35"x62"; geared both ends; 10 Hp.

JUICE EXTRACTORS—PULPERS

1971/G1 Chisholm-Ryder, American Utensil Stainless Model B Juice Extractor.
3100/G1 Indiana Brush Type Finisher with Stainless Steel Screens.

CUTTERS, CHOPPERS, GRINDERS, ETC.

4017 S 17 Urschel Model B Dicer-Slicer with 2 Hp motor.
2936/E1 Anderson Model No. 4 Dicer with 1 Hp motor.
4031 H 6 Albright-Nell Rotary Cutter 22"—11 Blades.
4024 F3 Paul Ohmis Horseradish Grater.
3020 D 1 Cincinnati Meat Grinder #32 Screw with 10 HP motor.
3484/A 31 Sterling Carborundum Type Potato Peeler with 2 HP motor.

FILLERS

2184/B48 Berlin Chapman 35 Station Syruper-Filler; up to No. 3's.
3053/M1 Berlin Chapman 7 Station Stainless Filler; up to No. 10's.
1200/W1 Heris Stainless 14 Station Gravity-Vacuum Filler up to quarts.
Karl Kiefer Rotary Vacuum Fillers; 12, 16 and 18 Station Machines on hand.
3051/M2 Ayers Stainless 12 Spout Series C Filler up to 5 dia. containers.
4042/G2 Pneumatic Scale 16 Spout Automatic Straight Line Filler.
Filler Machine Co. Piston Fillers; 2, 4, 7 and 11 Piston Units with non-corrosive contact parts; some with rising tables.
3484/A44 Mi. & S. 10 Pocket Stainless Steel Fillers for No. 1 Cans.
4031/W1 Mi. & S. 6 Pocket Bronze Filler for No. 2 Cans.
3040/B1 FMC Hand Pack Filler with 2 Stainless Rotating Tables for 202 and 300 Cans.
Stokes & Smith Auger Type Semi Aut. Powder Fillers Model G up to 5 lbs.
3520 Stokes & Smith 2 Station Filler Volumetric and Dribble Fill up to 5 lbs.
3073/L34 Triangle Elec-tri-pak Automatic Weigher-Filler 4 Station Model A4 with complete conveyor.

CAPPERS

Rosins single and double head automatic Cappers; Capom single and double head Cappers; Pneumatic Scale 4 head Capper.

LABELERS

Wrap around Labelers for cans, and round bottles, jars, etc., by Standard-Knapp, Burt, Kyser, Nu-Way, etc.
Spot Labelers by New Jersey Pony Labelrite, Ermold, World for any size container and label.
Fully Automatic Labelers by World, Pneumatic Scale; and others.

CASERS—PACKERS—PRINTERS

4089 Burt Caser for 303 Cans with 1/3 HP Motor.
2934/W1 Standard Knapp Model E Case Packer for No. 2 Cans.
3041/C10 Standard Knapp Model E Case Packer for No. 1 Cans.
3484/A10 Standard Knapp Master Case Packer Model 803—1 HP Motor.

SEND US YOUR INQUIRY

FRED R. FIRSTENBERG, Pres.

FIRST MACHINERY CORP.

209-289 Tenth St., Brooklyn 15, N. Y.
ST. 8-4672

SPECIAL OFFERING
EVAPORATORS

(1) Conkey Triple Effect Evap., Herculoy tubes, etc.
1st eff: 500 sq. ft.
2nd eff: 700 sq. ft.
3rd eff: 700 sq. ft.
Built 1945—NEVER USED

(1) Goslin-Birmingham Quadruple Effect Evap., (5 Body); Copper tubes, C. I. Body:
1st eff: 1360 sq. ft.
2nd, 3rd & 4th eff: 1775 sq. ft. ea.
Built 1946—Used about 2 years

IN STOCK

30 Stainless Steel Tanks from 30 gal. to 10,500 gal. sizes—New and used.
25 Stainless Steel and Stainless Clad Steam Jktd. Kettles from 40 gal. to 500 gal.

PERRY EQUIPMENT CORP.

1411 N. 6th St. PHILA. 22, PA.

FOR SALE

Complete Crystallizing & Filtering Unit installed 1951, used on Epsom Salts, capacity 1670 lbs. crystals per hr.;

Swenson Continuous Rubber Lined Vac. Cooling Crystallizer; Feinc 6' dia. Horiz. Filter S/S and Steel construction; Shriver 30" plate & frame Filter Press; 2100 gal. S/S Horiz. Tank; Pumps; Tanks; Kettles;

All units in very good condition.

THE MACHINERY & EQUIPMENT CORP.

533 West Broadway New York 12, N. Y.
GRamercy 5-6680
Harry Pearlman, Pres. Bill Wolf, Vice-Pres.

FOR SALE

Mayonnaise and Salad Dressing Machine 30 gal. "CABE" Emulsifier & Homogenizer Model S-50. Complete machine & Pump stainless S. Machine complete with tanks for mixing and holding oil, vinegar & water. Will mix, finish and pump to filler 30 gals. every 3 or 4 minutes. New condition $1,650.00

McARTHUR FOOD PRODUCTS CO.
6029 Jensen Houston 16, Texas

FOR SALE

Ten 3-Crate Retorts Size: 42 x 72. Excellent Condition 20 lb. Working Pressure 75.00 each F.O.B. Farmington, Maine.

50 Retort Crates Fair to Good Condition 38 x 22 5.00 each F.O.B. Farmington, Maine.

Burnham & Morrill Co., Portland, Me.

SALE

Filler—Ertel—10 Spout	$ 450.00
Bag Sealer—Seal Vac—Vacuum Type	$ 550.00
Filter—FredGoat—Satchel Bag	$ 880.00
Cello Bag Machine with Label Unit-Amsco	$1100.00
Cello Bag Machine with Label Unit-Amsco	$1540.00
Press—Farquhar—Fruit Press	$1100.00

Located Philadelphia, Pennsylvania—Offered as is, where is, subject to prior sale.

FS-7144, Food Engineering
330 W. 42 St., New York 36, N. Y.

IMPORTED

Morello Juice Concentrate, 50° Brix, 6.50, Ex Warehouse, New York

K. H. WERTHON, INC.
5 BEEKMAN ST.
New York 38, N. Y.—CO 7-1673

FOR SALE

Frick Evaporative Amm. Condenser, 20 tons.
75 gal. Monel jkt. Kettle, 38" x 27" agit.
100 to 300 gal. S.S. Mix Tanks, water jkt.
225 gal. S.S. Closed Tanks, Insul., 38" x 48".
300 gal. Horiz. S.S. Tank, 3' x 7', agit.
650 gal. Horiz. S.S. Tank, 4' x 7'.
5 ft. S.S. Vacuum Pan with accessories.
Double Effect S.S. Evaporator.
48" & 60" Centrifugal Extractors, S.S.
26" Centrifugal Extractors, 3 H.P.
Buflovak S.S. Spray Dryer, 500 lbs. per hr.
36" x 84" & 42" x 120" Double Drum Dryers.
75 to 1,500 gal. Homogenizers or Viscolizers.
3 H.P. Freon Compressor Unit.
3,000 gal. Glass Lined Tanks, Insul.
3—No. 10BB Waukesha Pumps, 1 H.P.
Milk Pasturizers, Cooters, Fillers, Washers.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street New York 17, N. Y.
Murray Hill 2-4616

FOR SALE

30-gal. stainless tank with cover, new; 500-gal. stainless clad tank, slightly used; Ermold labeler; cost us $1200, will sell 3 pieces for $600 cash, can be purchased separately.

FS-7274, Food Engineering
330 W. 42 St., New York 36, N. Y.

For Sale
6 x 6 YORK AMMONIA COMPRESSOR

Complete with 15 H. P. Motor, 3 phase, 220 volts. In very good condition, any reasonable offer—will take it—Available at once.

ZIMMERMAN'S BAKERIES, INC.
722 Broadway Hannibal, Missouri

For Sale:
CLOSING MACHINE

One American Can Closing Machine. Western semi-automatic for #10 cans. *Excellent condition.*

FS-7040 Food Engineering
330 W. 42 St. New York 36, N. Y.

Mod. 441 Viscolizer

Cherry Burrell, Used, 400-gallon per hour. Model 441 Viscolizer, motor driven. 15 HP, 3 phase, 60 cycle, 220 volt with stainless steel block. Used for homogenizing pharmaceutical, chemical, medicinal products. In excellent condition. Write

FS-7068, Food Engineering
330 W. 42 St., New York 36, N. Y.

For Sale
BOTTLE FILLER

One used Model 155 Mojonnier 24 head Sanitary, Vacuum Type Bottle Filler for quarts and pints complete with motor drive and controls.

FS-7094, Food Engineering
330 W. 42 St., New York 36, N. Y.

FILTRATION EQUIPMENT

We have two diatomaceous earth filters, stainless construction by Klein, one having 160 sq. ft. filtration area, and the second having 140 sq. ft., each one with separate closed slurry feeder of stainless construction. We only need one filter and will entertain reasonable offers for the second unit. Both practically new and guaranteed.

FS-7221, Food Engineering
330 W. 42 St., New York 36, N. Y.

For Sale
CARTON GLUERS & SEALERS

2 Standard Knapp shipping case carton gluers and sealers #429, top and bottom gluers and sealers.

CHEMICAL & PROCESS MACHINERY CORP
146 Grand Street New York 13, N. Y.

PACKAGING EQUIPMENT FOR SALE

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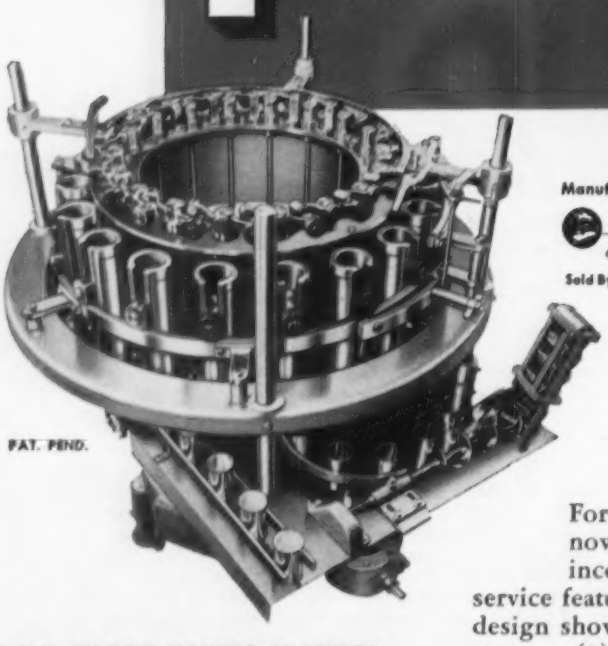

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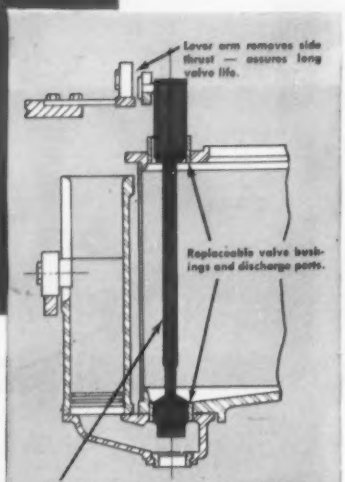
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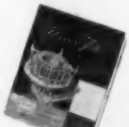

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